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FLORA OF PERU

BY

GABRIEL EDWIN
ASSOCIATE PROFESSOR, BIOLOGY
ROOSEVELT UNIVERSITY, CHICAGO

BOTANICAL SERIES
FIELD MUSEUM OF NATURAL HISTORY
VOLUME XIII, PART V–B, NUMBER 3
MAY 21, 1971

PUBLICATION 1125

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FLORA OF PERU

GABRIEL EDWIN[1]

SCROPHULARIACEAE. Figwort Family

References: Benth. in DC., Prodr. 10: 186–188. 1846. Schmidt in Martius, Fl. Bras. 8(1): 230–231. 1863. Benth. & Hook., Gen Pl. 2: 913–980. 1876. Wettst. in Engler and Prantl, Pflanzenf. IV(3b): 39–107. 1895. Kränzlin in Engler, Pflanzenf. IV, 257c: 1–122. 1907. Pennell, Acad. Nat. Sci. Phila. Monogr. I: 1–45. 1935. Thieret, Ceiba 4: 164–182. 1954.

Annual or perennial herbs or less often shrubs, occasionally vines (*Calceolaria* spp., *Maurandya, Antirrhinum*), glabrous to pubescent with unbranched, usually unicellular hairs (occasionally multicellular in *Calceolaria* spp.), sometimes glandular or pulverulent. Leaves usually opposite, sometimes alternate above and opposite below, occasionally all alternate or ternate, rarely rosulate, estipulate, rarely persistent (*Hebe*), entire to usually toothed to occasionally pinnately lobed or pinnate, rarely palmate, aciculate-linear to almost round, minute to 25 cm. long and longer, sessile to long-petiolate; inflorescences various, determinate or indeterminate, simple to compound spikes, racemes, dichasia, panicles or rarely umbellate, occasionally flowers solitary or few-clustered, bracts or bracteoles usually present and variously placed on the flower stalks; flowers bisexual, zygomorphic or rarely actinomorphic (*Capraria*); calyx 4–5-parted and tube lacking or more often tube present and calyx 2 (4–5)-toothed or -lobed, sometimes the tube appearing to split only once and then the calyx 2-lobed and usually at least partly one-sided on the flower, the sepals when free occasionally valvate, all alike or one or two variously modified and wider (*Bacopa*), imbricate when united, all alike or one longer (*Mimulus, Calceolaria* spp.) than the others; corolla

[1] The author acknowledges support from the National Science Foundation, grant GB 3560.

gamopetalous, the lobes 5, 4 or 2, rarely 3, usually bilabiate, the lips equal to very unequal, lobes arched or spreading, tube sometimes personate, long to almost lacking (*Veronica*), one or more anterior petals sometimes saccate or spurred, rarely anteriorly with a fine horn-like process at the base of a lobe (*Angelonia*) or the lips very unequal and inflated (*Calceolaria*) or rarely sub-equal and inflated (*Calceolaria, Porodittia*); stamens distinct, epipetalous, 5 or 4 or 2, usually arising from the base of the tube, one or more stamens sometimes modified to a staminode, when 4, commonly didynamous, the anterior pair frequently longer; anthers 2-celled or rarely one cell obsolete (*Buchnera, Calceolaria* spp.), cells equal or unequal, contiguous or separated on stalks, dorsifixed or versatile, dehiscing longitudinally, introrsely, sometimes splitting across the septum, rarely by terminal pores; an annular or lateral, nectar-bearing disc usually present, surrounding the ovary, or nectary on the reflexed edge of the lower corolla lobe (*Calceolaria*); pistil one, ovary superior, locules and carpels two (rarely unilocular), placentation axile; ovules numerous, anatropous, placentae often conspicuous, style terminal; stigma lobes 2, separate (*Gratioleae*) or united, punctiform, patelliform or ligulate; fruit usually a many-seeded capsule, mostly septicidal, sometimes loculicidal, occasionally indehiscent or poricidal (*Antirrhinum, Porodittia*), then locules unequal in size, the posterior smaller, rarely a berry (*Leucocarpus*); seeds smooth or variously marked, often angled, sometimes alate; endosperm soft, usually copious.

The family is cosmopolitan, containing over 200 genera and 3,000 species. The largest genera are *Pedicularis* with about 600 species and *Calceolaria* with more than 500 species. The family has its greatest concentration in South America, western North America, Africa, and the Mediterranean regions. The limits of this family as well as sectional and generic limits are still in dispute. A number of genera separable only technically and with difficulty from some Solanaceae, Gesneriaceae, Pedaliaceae, and Bignoniaceae.[1]

The family is of limited economic importance. Several species of *Calceolaria* (Slipper flower), *Antirrhinum* (Snapdragon), *Veronica* (Speedwell), *Mimulus* (Monkey flower), *Penstemon* (Beard-tongue), as well as *Cymbalaria, Russelia, Torenia,* and *Digitalis* are garden ornamentals. *Digitalis* yields alkaloids long used in medicine. Thirty-two genera with 226 species occur in Peru. In addition, *An-*

[1] The reader should remember that this and following descriptions are based upon Peruvian material and may not be applicable elsewhere.

tirrhinum majus L. (Snapdragon) is commonly cultivated in Peru but shows no tendency to escape.

KEY TO THE SUBFAMILIES, TRIBES, AND SUBTRIBES

1. Posterior lobes of the corolla external and overlapping in the bud. Subfam. A. Scrophularioideae.
   2. Corolla not enlarged at the base and not spurred anteriorly, occasionally merely little saccate, with or without a fine horn-like process at the base of the anterior lobe; capsule septicidal or loculicidal by a simple median split, the septum breaking from the capsule wall or rupturing, or the fruit indehiscent.
      3. Stigma usually 2-lipped, when lips united plants subaquatic and acaulescent or with repent or underground stems or with sepals unequal in width; or stigma lips clavate; if tube almost lacking corolla subrotate, with 4 distinct lobes; herbage most often glandular punctate . . . . . Gratioleae.
         4. Capsule usually septicidal, occasionally secondarily loculicidal, splitting to the base, when loculicidal the outermost sepal broader than the others; placenta simple; sepals usually distinct or almost so (except *Linaria* spp., *Limosella*), sometimes very unequal in width (*Bacopa*); leaf blades and capsules usually glandular-punctate; inflorescences usually simple, racemose or the racemes sometimes with fascicles of pedicellate flowers; anterior lobes of the corolla usually smooth and glabrous within. Ia. Gratiolinae.
         4. Capsule loculicidal (secondarily barely if at all septicidal); the outermost sepal about equal to the others in width; or fruit an indehiscent berry; placenta branched; sepals united over half their length; leaves and capsules glabrous or pubescent but not glandular-punctate; flowers singly pedicellate (in ours); anterior lobes of the corolla two-ridged and pubescent within . . . . . Ib. Mimulinae.
      3. Stigmas united, capitate; plants terrestrial and caulescent; sepals equal in width; if corolla tube very short, corolla with less than 4 distinct lobes; herbage with vesture various but not glandular-punctate.
         5. Capsule packed with hair internally; corolla weakly zygomorphic, corolla-tube well developed; leaves in whorls of threes on angled stems . . . . . II. Russelieae.

5. Capsule without hair internally; corolla decidedly zygomorphic, the anterior lobes usually much exceeding the posterior, tube often short; leaves opposite or the upper alternate, occasionally ternate on terete stems.
   6. A fine horn-like process developed at the base of the corolla lobes anteriorly.....III. Angeloneae.
   6. Corolla lobes without a horn-like process at base, lips sometimes concave-saccate.
      7. Stamens 4; corolla flattened, its lobes all evident; the 5 sepals less than half the length of the capsule; seeds blackish; inflorescences simply racemose; stem quadrangular.....IV. Hemimerideae.
      7. Stamens 2 or occasionally 3; lips of the corolla concave-saccate (calceolate) or the posterior (upper) much reduced, the individual lobes scarcely or not at all evident; sepals 4, at least one-half the length of the capsule, seeds brown; inflorescences usually dichasiate or cymose; stem terete or nearly so, occasionally squarrose above.....V. Calceolarieae.

2. Corolla anteriorly gibbose or saccate at base or with a spur at the base of the anterior petal; capsule loculicidal, the septum and adjacent cell wall persisting, the remaining wall splitting irregularly.....VI. Antirrhineae.

1. Anterior lobes of the corolla external and overlapping in the bud. Subfam. B. Rhinanthoideae.
   8. Upper corolla lobes flattened or widely arched, often spreading; anthers all distinct; stigma lobes distinct or united.
      9. Stigmas distinct, plate-like; capsule septicidal and sometimes secondarily loculicidal.....VII. Digitaleae.
      9. Stigmas united (*except Gerardia* sect. *Dasistoma*); capsule loculicidal.
         10. Anther cells divaricate; sepals united, 5. VIII. Ouriseae.
         10. Anther cells parallel; sepals 4 and free or united.
            11. Stamens usually 2, less often 3–5 (8); corolla rotate or subrotate, posterior lobes united; plants autophytic.....IX. Veroniceae.
            11. Stamens 4; corolla, salverform or campanulate; all lobes evident and free; plants root-parasites or saprophytes.....X. Buchnereae.

8. Upper corolla lobes narrowly arched, forming a definite galea that encloses the frequently cohering anthers; pollen shed in a mass; stigma lobes almost always united. . XI. Euphrasieae.

KEY TO GENERA

Subfamily. A. Scrophularioideae (Antirrhinoideae of authors)

TRIBE I. Gratioleae, Subtribe a. Gratiolinae

1. Leaves all alternate; corolla actinomorphic or weakly zygomorphic; stamens 5 or 4 ..... *Capraria.*
1. Leaves opposite or verticillate or the upper sometimes alternate; corolla basically zygomorphic, obscurely so in *Scoparia*; stamens 4 and didynamous or sometimes less than 4 (3 or 2).
   2. Plants acaulescent; anther cells wholly confluent. . . *Limosella.*
   2. Plants caulescent; anther cells distinct.
      3. Stem usually terete, or if quadrangular, without ridges or wings; ridges to the anterior-lateral sinuses of the corolla (due to adherence of the filaments) if developed low and not projecting beyond; filaments simple; style without a semipersistent callosed base.
         4. Anther-sacs proximate, stipes developed or not; seeds reticulate; when anther-sacs stipitate, corolla 5-lobed, when proximate corolla usually 4-lobed.
            5. Sepals unequal, at least 1 or 2, usually the outer, wider than the others; corolla glabrous within; anther-sacs stipitate or not ..... *Bacopa.*
            5. Sepals equal; corolla variously pubescent within; anther-sacs proximate.
               6. Pedicels bibracteolate at apex (just below the calyx); corolla pubescent within, usually only at the base of the anterior lobes, occasionally on both lobes to the base of the tube, plant repent-ascending to suberect or erect; pedicels at least 3 times longer (up to 4 or more times longer) than the calyx; corolla clearly zygomorphic, 5-lobed ..... *Conobea.*
               6. Pedicels ebracteolate; corolla densely hirsute within at the bases of all the lobes; plant erect; pedicels often less than 3 times longer than the calyx; corolla obscurely zygomorphic, 4-lobed ..... *Scoparia.*

4. Anther-sacs separated on stipes (connective arms); seeds longitudinally striate and/or tuberculate-striate; corolla 4-lobed ..... *Stemodia.*

3. Stem quadrangular, the angles ridged or with small wings; two raised ridges to the anterior lateral sinuses of the corolla (formed by the adherence of filaments) often projecting beyond these points as a knob-like process, the free part of the filament appearing as a lateral outgrowth of the adherent part; style semi-persistent, frequently enlarged and callosed at the base.

7. Stamens 4, all antheriferous or 2 sterile (staminodes) ..... *Lindernia.*

7. Stamens 2 ..... *Micranthemum.*

Subtribe b. Mimulinae

8. Capsule dehiscing longitudinally; calyx tube longer than the capsule; inflorescence with axillary, unbranched pedicels .. *Mimulus.*

8. Berry indehiscent; calyx tube shorter than the berry; inflorescence of much branched axillary cymes, borne on conspicuous peduncles ..... *Leucocarpus.*

TRIBE II. Russelieae

A single genus ..... *Russelia.*

TRIBE III. Angeloneae

A single genus ..... *Angelonia.*

TRIBE IV. Hemimerideae

9. Corolla orange, tube split to the base anteriorly; capsule secondarily scarcely loculicidal ..... *Alonsoa.*

9. Corolla white or blue or violet, split only part way anteriorly, if at all; capsule secondarily, clearly loculicidal ..... *Basistemon.*

TRIBE V. Calceolarieae

10. Anthers 2, opening by slits; corolla with two lips ... *Calceolaria.*

10. Anthers 3, opening by pores; corolla with three lips .. *Porodittia.*

TRIBE VI. Antirrhineae

11. Herbs; corolla either with a definite spur or gibbous anteriorly at the base, throat at least partly closed; calyx lobes clearly imbricate.

12. Corolla spurred anteriorly at the base, throat closed by the palate; anther-sacs parallel, distinct and oblong; stems erect or spreading, procumbent ..... *Linaria.*

12. Corolla gibbous anteriorly at the base, palate lacking (except in *M. antirrhiniflora*) but throat partly closed by plaiting or 2 lines of hairs; anther-sacs confluent; plant twining (by means of petioles and pedicels); perennial herbs .. *Maurandya.*[1]

11. Shrubs; corolla merely saccate anteriorly at base, throat not closed by the palate; calyx lobes only slightly imbricate. *Galvesia.*

Subfamily. B. Rhinanthoideae

TRIBE VII. Digitaleae

A single genus ..... *Digitalis.*

TRIBE VIII. Ouriseae

A single genus ..... *Ourisia.*

TRIBE IX. Veroniceae

13. Stamens more than 2, usually 3–5 (–8); sepals 4–5 (–8) united into a campanulate calyx ..... *Sibthorpia.*

13. Stamens 2; sepals 4, rarely 5, essentially free, calyx tube if developed, very short, not campanulate.

14. Herbs ..... *Veronica.*

14. Shrubs or small trees ..... *Hebe.*

TRIBE X. Buchnereae

15. Stamens with both anther cells developed; corolla campanulate or when salverform 8–15 cm. long or more; calyx campanulate or when tubular, the tube 2.5–6.0 cm. long or longer.

16. Corolla salverform; calyx tubular; capsule ellipsoid; seeds linear ..... *Escobedia.*

16. Corolla and calyx campanulate or almost so; seeds usually broader than linear, when linear borne in a subglobose capsule ..... *Gerardia.*

15. Stamens with only one anther cell developed; corolla salverform, the tube less than 3.0 cm. long; calyx tubular, the tube not exceeding ca. 1.0 cm. long ..... *Buchnera.*

[1] *Antirrhinum* spp. widely cultivated in Peru treated at the end of this genus, in text.

TRIBE XI. Euphrasieae

17. Anther-sacs equally placed; the leaves usually opposite (some *Bartsia* spp. alternate).
    18. Upper lip of the corolla reflexed-margined..... *Euphrasia.*
    18. Upper lip of the corolla erect-margined
        19. Lower lip of the corolla neither prominently 2-ridged nor 2-plaited; seeds multistriate, testa close, reticulate. *Bartsia.*
        19. Lower lip of the corolla prominently 2-ridged or 2-plaited; seeds smooth within a loose, tuberculate and reticulate testa..... *Lamourouxia.*
17. Anther-sacs unequally placed, the upper one attached by its middle; leaves all or mostly alternate.
    20. Lower lip of the corolla equal to or larger than the often obtuse galea..... *Orthocarpus.*
    20. Lower lip of corolla smaller than the sharper galea. *Castilleja.*

ALONSOA R. & P.

Branched herb or more often shrub, often glabrous except in the inflorescence, occasionally pilose to glandular-pubescent, branches mostly 4-angled at least above. Leaves sessile or petiolate, mostly opposite or ternately verticillate, floriferous leaves alternate, bract-like; flowers in racemose inflorescences, usually terminal, glandular-puberulent, pedicels ebracteolate; calyx 5-parted, sepals narrow; corolla zygomorphic, mostly orange, varying to scarlet-red, resupinate, explanate-rotate, the short tube cleft to the base or almost so posteriorly; stamens 4, filaments longer or shorter than the divergent anthers that are confluent at apex; stigma lobes united capitate; capsule ovoid or oblong, septicidal, and scarcely secondarily loculicidal, usually dehiscing apically to the middle; seed numerous, small, black or almost so, most often longitudinally furrowed.

The genus is made up of about 12 species distributed from Mexico to Peru, but not in the West Indies. Only one species in Mexico and Central America. The area of greatest concentration is found in the Andes Mountains. Eight species reported in Peru.

1. Leaves essentially linear and entire or distantly serrulate.
    2. Anthers longer than the filaments; herbage, pedicels and calyces subglabrous, puberulent or glandular-puberulent. *A. linearis* var. *linearis.*

2. Anthers shorter than the filaments; herbage, pedicels and calyces glabrous ..... *A. linearis* var. *glaberrima.*

1. Leaves broader than linear, lanceolate to ovate or deltoid-ovate, margins mostly more deeply and closely toothed, usually serrate to incised-dentate (except *linearis* var. *platyphylla*).

3. Anthers longer than the filaments.

4. Leaves sparsely serrulate or entire, not more than 8.0 mm. broad.

5. Blade margins sparsely serrulate; calyx lobes usually glabrous, up to 5 mm. long, less than fourth the mature fruit; branches glabrous above; leaf blades mostly winging a short (ca. 1 mm.) petiole.
A. linearis var. *platyphylla.*

5. Blade sessile, margins entire; calyx lobes glandular-pubescent, 7–8 mm. long, usually more than fourth the mature fruit; branches glandular-pubescent above.
A. integrifolia.

4. Leaves closely serrulate to serrate or dentate, sometimes more than 8.0 mm. broad.

6. Leaf blades 3 or more times longer than wide (rarely about 2.7 times longer than wide with glandular pedicels), usually lanceolate or lance-ovate.

7. Corolla auriculate at the base of the posterior lobes; herb; pedicels glabrous ..... *A. auriculata.*

7. Corolla not auriculate at base of the posterior lobes; shrub; pedicels usually glandular-pubescent.
A. acutifolia.

6. Leaf blades up to about 2.2 times longer than wide, usually ovate or oblong-ovate; pedicels glabrous.
A. mathewsii.

3. Anthers shorter than the filaments ca. one-third to one-fourth the length of the filaments.

8. Leaf-blades less than 2 cm. long, often sessile, if margins toothed, teeth few or reduced, spine-like; petiole when present not exceeding 2 cm.

9. Leaf blade margins with spine-like, very sharp teeth, sinuses lacking, main blades lanceolate; stems glandular-puberulent, at least above; corolla red . . . *A. minor.*

9. Leaf blade margins few-toothed, the teeth broader, sinuses present, main blades elliptic or elliptic-subovate; stems glabrous; corolla white or almost so. . . . *A. pallida.*

8. At least some of the leaves more than 2 cm. long; at least some petioles more than 2 mm. long, margins almost always beset with numerous teeth. . . . . *A. meridionalis.*

Alonsoa acutifolia R. & P., Syst. Veg. Fl. Peruv. 153. 1798.

Shrub or subshrub, stems and branches usually pubescent or glandular-pubescent, at least on upper half, less often pilose or merely puberulent, occasionally wood glabrous, inflorescence excepted. Leaves often puberulent or pubescent, lanceolate to lance-ovate, sometimes linearly lanceolate, up to 6 cm. long and 2 cm. wide, usually about 2–3 cm. long and 0.7–1.0 cm. wide, sharply serrate, serrations often hardened, sharp-pointed, sometimes distant, occasionally irregular, acute to long-acute at apices, narrowed to usually acute bases, secondary veins subobsolete, often only 3-pair visible, tissue epunctate beneath; inflorescences racemose or racemes, terminal on the branches; flowers axillary to reduced leaf-like bracts, pedicellate and solitary or rarely 2 flowers in an axil; pedicels longer than the mature flower and fruit, usually glandular-pubescent, occasionally glabrous or almost so; calyx with 5, elliptical or oblong, dimidiate, acute, usually glandular-pubescent lobes; corolla usually glabrous, orange to red, anterior lip 2–3 times longer than the calyx, posterior little exceeding the calyx; stamens about 6 mm. long, anthers about twice as long as the filaments; style twice the length of the ovary, stigma lobes united, capitate or punctiform; capsule lance-ellipsoid to lance-ovoid, up to 1.7 cm. long; seed broadly ovoid, black, blunt. Common and widely distributed in Andean Peru; also found in montane Bolivia.

Amazonas: Prov. Chachapoyas, Sierras, alt. 2,700 m., *Ll. Williams 7569.*—Apurimac: Prov. Abancay, upper Río Marañon, alt. 3,000 m., *Stork & Horton 10646*; Prov. Andahuaylas, Quebrada N. of Chincheros, alt. 2,800 m., *Stork & Horton 10763*; Río Pachachaca, alt. 3,400 m., *Weberbauer 5909* (possibly Prov. Abancay).—Cajamarca: Prov. Celendín, Vicinity of Celendín, upper hills, *Woytkowski 22.*—Cuzco: Quebrada de Celiska-huara, alt. 3,400 m., *Herrera 1503*; "Aya-maichía," Huancayo, *C. Vargas C. 3130.*—Huancavelica: Alt. 3,798 m., *Soukup 2782*[1]; Prov. Huancavelica, 1 km. N. of Huan-

[1] Pedicels and calyces glabrous.

cavelica, limestone boulder area, alt. 3,700 m., *Stork & Horton 10921*[1]; Surcubamba: edge of forest, roadsides and pastures at alt. 2,500 m., *Stork & Horton 10364*.—Junin: Prov. Tarma, 2–4 km. E. of Huasahuasi, alt. 2,400–2,500 m., *Hutchinson 1126*; Tarma, open hillside, alt. 3,000–3,200 m., *Killip & Smith 21859*.—Puno: Lake Titicaca. alt. 4,000 m., Leg. ?; *Soukup 574*.—Sin Loc: *Soukup 130*; *1227*; *1271*,

Alonsoa auriculata Diels in Engler, Bot. Jahrb. 37: 426. 1906.

Perennial, subglabrous herb, stems minutely pilose or glabrous, branched from the base. Leaves verticillate-ternate up to the inflorescence, alternate in the inflorescence, lanceolate or lance-ovate, 4–7 cm. long and about 2 cm. wide, margins acutely serrate, acute at apex, acutely narrowed to base, petioles 1.0–1.5 mm. long; inflorescence racemose; flowers axillary to reduced leaf-like bracts, pedicellate; pedicels 12–18 mm. long, erect; calyx of 5 sepals, united only at base, lance-oblong, acuminate, glandular-pilose or glabrous, 2–5 mm. long; corolla glabrous, scarlet or red, posterior lip 4 mm. long and 5 mm. wide,[2] auriculate at base of the lobes, anterior lip with lateral lobes ca. 4 mm. long and 7 mm. wide and median lobe broadly triangular, 7 mm. long and 11 mm. wide; stamens 4, deflexed, filament 1 mm. long, anthers 3 mm. long, oval; capsule up to 10–12 mm. long and about half as wide, ovoid or lance-ovoid; seed black, oblong, blunt, longitudinally furrowed; placenta columnar, naked, septum soon lost after dehiscence.

Cuzco: Grassy slopes above Pillahuata, Cerro de Cusilluyac, 2,500–3,600 m., *Pennell 13927*.—Puno[3]: Sandia, *Weberbauer 525*.

Alonsoa integrifolia Edwin, Fieldiana: Botany 31 (8): 228–229. 1967.

Branched shrub, stems terete, glandular-pubescent, at least above. Leaf blades sessile, linear-lanceolate to elliptically lanceolate, 0.5–2.0 cm. long and 0.1–0.3 cm. wide, entire, narrowed to apex and somewhat to base, decreasing in size from base to apex of stem, punctate beneath, lower glabrous, upper sometimes puberulent or sparsely glandular-puberulent beneath, costa little impressed above, flattened and elevated beneath; inflorescence racemose; flowers mostly near the apices of the branches and branchlets, axillary to a bract-like leaf,

[1] Pedicels and calyces glabrous.

[2] The lower lip due to 180° twisting of the pedicel.

[3] The type, collected at 2,100–2,300 m., destroyed at Berlin.

pedicellate; pedicels 10–12 mm. long, glandular-puberulent, usually 2 times longer than the subtending bract; calyx tube very short, sparsely glandular-puberulent, calyx lobes lanceolate, 7–8 mm. long, more than fourth the length of the mature capsule; corolla red[1]; stamens 4, anthers confluent, longer than the filaments; ovary ovoid or lance-ovoid, little longer or shorter than the style, united stigma lobes subpatelliform; capsule lance-ovoid or ovoid, ca. 12 mm. long, about 6 mm. wide at base, 1–2 mm. wide at apex; seed usually blunt, or acute at one or both ends.

Cajamarca: Michiquillo; shrub. Calcareous slope at alt. 3,000 m., *Pennell & Reichlin 15033*—the type and only collection.

Alonsoa linearis (Jacq.) R. & P., Syst. Veg. Fl. Peruv. 154. 1798. *Celsia linearis* Jacq., Ic. Rar. 3: *t. 497*. 1786. *Hemimeris linearifolia* HBK., Nov. Gen. et Sp. 2: 377. 1817. *Alonsoa linearifolia* Steud., Nomen. ed. 2. 60. 1840.

Branched shrub, occasionally subshrub[2] to 1.0 or 1.5 m. tall, glabrous, or glandular pubescent in the inflorescence.[3] Leaves linear, to narrowly lance-ovate, not exceeding 8 mm. wide, acute to long-acute both to base and apex, sessile or short-petiolate, 4 or more times longer than wide, or 2 to 3 times longer than wide, margins entire or serrulate; flowers in racemes, each subtended by a reduced bract and usually 1 in each axil, pedicellate; pedicels longer to less often shorter than the flower and fruit; calyx of 5 linear to narrowly lanceolate sepals that are united only at the base, up to 5 (–7) mm. long and 1 mm. wide; corolla orange to scarlet-red, 8–10 mm. long, posterior lip 2-lobed, due to the 180° twisting of the pedicel becoming the lower lip, anterior lip 3-lobed, all lobes rounded ovate; stamens inserted at the base of the corolla tube, anthers longer or shorter than the filaments, yellow, when anthers longer than the filaments, ca. two times or more longer, when shorter (var. *glaberrima*) about a third to a fourth as long as the filaments: ovary ellipsoid, much shorter than the style that is slightly thickened at apex and base, stigma lobes united capitate or coronate; capsule 5–16 (–18) mm. long, lance-ovoid, or -oblong, placenta columnar. All collections so far seen are from Peru.

[1] Well pressed corolla lacking; but from the scant material, corolla resupinate, 2-lobed posteriorly and 3-lobed anteriorly.

[2] Sometimes dying back to the ground but not an annual as indicated on some labels, at least in Peru.

[3] Gland-bearing hairs caducous and collections sometimes entirely glabrous in fruit in var. *linearis*.

KEY TO THE VARIETIES OF *Alonsoa linearis* (Jacq.) R. & P.

1. Leaves linear, at least four times longer than wide; fruit usually up to 12 mm. long, rarely up to 15 mm.; pedicels usually less than 2 cm. long, when longer the bracts almost equaling the pedicels in length.
   2. Anthers longer than the filaments; plants glandular-pubescent in the inflorescence at least in flower; fruit usually twice as long as or longer than the basal width; corolla usually orange. *A. linearis* var. *linearis.*
   2. Anthers only a third or a fourth as long as the filaments; plants glabrous even in flower; fruit often less than twice as long as the basal width; corolla usually red or scarlet-red. *A. linearis* var. *glaberrima.*
1. Leaves wider than linear, often narrowly lance-ovate, 2–3 times longer than wide; fruit often more than 12 mm. long, up to 17 mm.; pedicels usually more than 2 cm. long; bracts only a few mm. long..... *A. linearis* var. *platyphylla.*

A. linearis (Jacq.) R. & P. var. **linearis**

Ancash: Prov. Huaraz, Baños de Chancos, alt. 8,500 ft., *Sandman 4602.*—Huanuco: San Rafael, alt. 2,697 m., *Soukup 2243*; Carpish, 28 m., *Stork & Horton 9884.*—Junin: Mito, sunny blackberry patch, alt. ca. 9,000 ft., *Macbride & Featherstone 1413.*—Lima: Matucana, Rimactal alt. 2,500 m., *Rauh-Hirsch P175.*—Sin Dept.: Yanano, sunny, grassy slopes, alt. about 6,000 ft., *Macbride 3771.*—Sin. Loc.: *Weberbauer 6326*; *Woytkowski 34134.*

A. linearis var. **glaberrima** Edwin, Fieldiana: Botany 31 (8): 230–231. 1967.

Ancash: Cordillera Blanca, herb to 80 cm. tall. *Kruzl P2279.*—Lima: Canta, rocky slopes, alt. 2,700–2,900 m., *Pennell 14556*; Matucana, alt. about 8,000 ft., rocky slopes, *Macbride & Featherstone 115.*

A. linearis var. **platyphylla** (Diels) Edwin, comb. nov.; *A. linearifolia* var. *platyphylla* Diels in Engl., Bot. Jahrb. 37: 427. 1906.

Junin: Tarma, alt. 7,000 ft., *Macbride & Featherstone 1023.*

At present it seems better to recognize the varieties of *linearis*, although future collections may blur the distinctions since all occur in north-central Peru.

Alonsoa mathewsii Benth. in DC., Prodr. 10: 250. 1846.

Perennial glabrous herb, stems terete, branched. Leaves petiolate[1] to sessile, usually ternate-verticillate, alternate in the inflorescence, ovate or oblong-ovate, up to 3.5 cm. long and 1.8 cm. wide, serrate, acute at apex, narrowed to base and subacute, secondary veins prominent beneath and subprominent above, subparallel, 5-pair, forming acute angles with the costa, blades punctate beneath; petioles up to 15 mm. long, usually only 7–8 mm.; inflorescences racemose; flowers axillary, pedicellate; pedicels up to 2.2 cm. long; calyx lobes elliptical, long-acute, about 5 mm. long; corolla red, externally sparsely pubescent, posterior lip only little exceeding the sepals, anterior about twice as long; anthers reniform to lanceolate, 3 times longer than the 1 mm. filament; ovary much shorter than the style, stigma lobes united, punctiform; capsule ovoid, up to 11 mm. long and 6 mm. wide; seed black, acute at one or both ends, placenta columnar, naked.

Amazonas: Prov. Chachapoyas, Puente de Pipos, on Río Sonche opposite Daguas east of Chachapoyas. Banks, alt. 2,000 m., *Pennell 15750.*—Cajamarca: *Edwin 3557; 3561.*

Alonsoa meridionalis (L.f.) Ktze., Rev. Gen. 2: 457. 1891. *Scrophularia meridionalis* L. f., Suppl. 280. 1781. *Alonsoa caulialata* R. & P., Syst. Veg. Fl. Peruv. 152. 1798. *A. procumbens* R. & P., Syst., Veg. Fl. Peruv. 153. 1798. *A. incissaefolia* R. & P., Syst. Veg. Fl. Peruv. 154. 1798. *Celsia urticaefolia* Sims., Curt. Mag. 12: *t. 417.* 1798. *Hemimeris urticaefolia* Willd., Sp. Pl. 2(1): 282. 1800. *H. procumbens* and *H. caulialata* Pers., Syn. Fl. 2: 162. 1807. *H. parviflora* and *H. mutisii* HBK., Nov. Gen. et Sp. 2: 376. 1817. *H. intermedia* Lodd, Bot. Cab. *t. 1456.* 1829. *Alonsoa parviflora* and *A. mutisii* Steud., Nomen. ed. 2. 60 and *A. urticeaefolia* 61. 1840. *A. incisaefolia* var. *latifolia* Benth. in DC., Prodr. 10: 250. 1846. *A. warscewiczii* Regel, Gartenfl. 3: 211. *t. 91.* 1854.

Herbs, subshrubs or occasionally shrubs, usually much branched, stems and branches mostly 4-angled and often striate-ribbed, usually erect, occasionally procumbent, glabrous or subglabrous, the pedicels sometimes pubescent, rarely with the branchlet apices glandular-pubescent. Leaves opposite, occasionally lowermost ternate-verticillate, usually petiolate, rarely sessile, ovate, lance-ovate, less often

[1] Original description, "breviter petiolatis sessilibusive," and "lanceolatis oblongsive," in other respects the material at hand agrees with the protologue even to the location.

lanceolate, occasionally broadly or triangular-ovate, up to 4–5 cm. long and 3.0–3.5 cm. wide, usually about 3.0–3.5 cm. long and 1.0–1.5 cm. wide, apices acute, bases very variable from obtusely or rounded-cordate to subacute or acute, margins serrate, serrate-dentate or dentate, teeth close and sharp; petioles mostly 3–8 mm. long; inflorescences terminal, racemes or racemose; flowers axillary, bracteate, pedicellate; bracts much shorter than the pedicels, linear to lanceolate, serrate; pedicels about 1.5–5.0 times longer than the flowers and fruit; calyx lobes lanceolate, 4–5 mm. long and 1.0–1.7 mm. wide, entire, tube almost lacking; corolla orange to dark red, lips very unequal, the 2-lobed posterior up to 1.5 times the length of the sepals, anterior lip about 2–5 times longer than the sepals; stamens exceeding the throat, the anthers a third to a fifth as long as the thin filaments; style 2–3 times longer than the ovoid ovary, stigma lobes united, punctiform; capsule 0.8–1.3 cm. long, ovoid to lance-ovoid; seed shining black, oblong, blunt, longitudinally furrowed, placenta columnar, septum caducous soon after dehiscence.

Amazonas: Llama, rain-forest (Cutervo) *Sandeman 4136*; Prov. Hualgayoc, alt. 1,800 m., *Soukup 3852*.—Arequipa: lower slopes of Misti, alt. 9,500 ft., *Sandeman 3785*; Prov. Condesuyos, Chuquibamba, alt. 10,500 ft., *Stafford 1203*.—Cuzco: Paucartambo, alt. between 2,500–3,600 m., *C. Vargas C. 47*.—Huanuco: open situation, alt. 2,700 m., *Woytkowski 80*.—Junin: near Huancayo, alt. 3,300–3,500 m., *Weberbauer 6650*; Prov. Tarma, Aqua Dulce, alt. 1,800 m., *Woytkowski 35496*.—Lima: Río Blanco, alt. 3,000–3,500 m., *Killip & Smith 21537*; Matucana, alt. about 8,000 ft., *Macbride & Featherstone 105*; Río Chillon above Obrajillo, alt. 2,700–3,300 m., *Pennell 14360* and *14402*; San Buenaventura, alt. 2,700–2,900 m., *Pennell 14535*; Rimac Valley, alt. 3,500 m., *Rauh-Hirsch P214*.—Sin. Loc. et Leg: ex herb *Ruiz & Pavon*.—Moquequa: Carumas, in a moist ravine, alt. 3,000 m., *Weberbauer 7284*.—Sin. Depto.: Yanano, alt. about 6,000 ft., *Macbride 3738*; Valle de San Miguel, alt. 2,060–2,260 m., *Herrera 2001*.

At least three infraspecific categories could be presented based upon differences in leaf-bases, pedicel length in relation to flower length, relative sizes of corolla lobes, procumbent as opposed to erect growth forms and kinds of leaf blade margins. However, this taxon is so commonly collected that these characters, leaf-bases excepted, overlap throughout most of its range. Therefore, it seems the better course at least for the present to retain a single polymorphic taxon.

The commonest species of the genus, collected from Mexico through Central America to Equador, Colombia, Venezuela and Chile as well as Peru. Not known east of the Andean chain. The center of concentration is in Colombia.

Alonsoa minor Edwin, Fieldiana: Botany 31 (8): 229–230. 1967.

Branched shrub, apices of branchlets glandular-pubescent. Leaves very narrowly lanceolate, subsessile, up to 1.9 cm. long and 0.6 cm. wide, margins few-serrate, serrations narrow, hard, attenuate to apices and bases, sparsely black-punctate beneath; inflorescences racemose; flowers axillary, solitary, pedicellate; pedicels glandular-pubescent, up to 1.7 cm. long, longer than the flower, fruit and subtending bract; calyces salverform in bud, tube very short, lobes 2.5–3.5 mm. long, elliptical to narrowly-elliptical, acuminate; corolla red to dark red, lobes shorter than the tube; stamens longer than the corolla tube, exserted beyond the throat but shorter than the lobes, anthers axe-shaped, densely pubescent, shorter than the filaments; ovary little longer to little shorter than the style; immature capsule 9–10 mm. long and 4–5 mm. wide, ovoid; seed black.

Amazonas: Above Calcamar, in thin soil over limestone rocks, alt. 2,600–2,900 m., *F. W. Pennell 15609;* Chachapoyas, Cerro Calla-Calla, 8 km. W. of Leimebamba, *Edwin 3702.*

Alonsoa pallida Edwin, Fieldiana: Botany 31 (8): 230. 1967.

Glabrous, erect, oppositely branching shrub, branchlets square. Leaves elliptical or subovate elliptical, up to 1 cm. long and 0.6 cm. wide, short-petiolate, margins few-toothed, serrate to laciniate, sometimes dimidiate at base, young blades sometimes puberulent above, nerves elevated beneath; petioles up to 2 mm. long; inflorescences racemes; bracts minute; pedicels glabrous, up to 9 mm. long, shorter than the capsule; mature flowers lacking; calyx lobes about 3 mm. long, lanceolate or narrowly elliptic, acuminate, 3-nerved, tube lacking; corolla white; stamens included in the corolla tube; anthers sagittate, shorter than the filaments; capsule 7–10 mm. long and 3–5 mm. wide, ovoid; seed shining black. Known only from the type.

Cajamarca: Below Llama. Herb with whitish corolla. Banks, alt. 1,900–2,100 m., *Pennell 15918* (BM).

ANGELONIA H. and B.

Herbs or occasionally subshrubs, glabrous, viscid, glandular-pubescent, stems and branches often 4-angled at the apices, round

below. Leaves all opposite or opposite below and becoming subopposite and then alternate base to apex, blades narrowly lanceolate to ovate, subsessile or sometimes sessile; flowers axillary, pedicellate, 1 or 2 in each axil or few-clustered in axils;[1] calyx 5-toothed or more deeply cut; corolla with short tube, subrotate, explanate, 2-lipped, lobes 5, rounded, the 2-lobed posterior lip a little shorter than the 3-lobed anterior lip that is saccate at the throat and supplied with a horn-like process at the base; stamens 4-didynamous, filaments short, anther locules distinct, divaricate; ovary shorter than the style, stigma lobes united, punctiform or capitate; capsule loculicidal, rarely secondarily septicidal; seed brown to yellow-brown with raised wing-like reticula.

About 15–20 species, generally distributed in tropical America, greatest concentration in Brazil.[2]

Two species collected in Peru. One of these only doubtfully an *Angelonia*.

Leaves lanceolate, most or all, four or more times longer than wide; plants viscid, glandular-pubescent . . . . . *A. angustifolia*.

Leaves ovate, less than four times longer than wide; plants essentially glabrous (wood and petioles sparsely puberulent) . . *A. procumbens*.

Angelonia angustifolia Benth. in DC., Prodr. 10: 254. 1846.

Viscid, glandular-puberulent herbs or subshrubs.[3] Leaves up to 9 cm. long and 1 cm. wide, mostly much smaller, margins closely to distantly serrate or serrulate, sometimes subentire, acute, narrowed to base, petiole when present up to about 1 mm. long, costa visible, remaining nerves obsolete or almost so; pedicels from 0.8–2.0 cm. long; flowers usually 2, sometimes 1 in each leaf axil,[4] calyx about 4–6 mm. long, sepals elliptical, acute; corolla purple or blue-purple, about 2–3 times longer than the calyx; stamens short, filaments 1–2 mm. long, little longer or shorter than the anthers; pistil about 3–4 mm. long; capsule much exceeding the calyx, globose, style persistent; seed conical, interspaces of reticula deep, testa appearing honeycomb-like.

[1] Extra Peruvian material sometimes with flowers in terminal racemes.

[2] In the last 30 years there has been a great proliferation of specific epithets in this genus. A careful monograph would prove most useful.

[3] Extra Peruvian material frequently glabrous.

[4] Extra Peruvian material almost always one flower in each leaf axil.

Loreto: Palta-Cocha on the upper Río Nanay, *Ll. Williams 1279*; San Salvador on the Amazon River, *Ll. Williams 1550*; Pebas on the Amazon River, *Ll. Williams 1818*; La Victoria on the Amazon River, *Ll. Williams 2749*; Iquitos and vicinity, alt. 120 m., *Ll. Williams 3580*; Lower Río Huallaga, alt. 155–210 m., *Ll. Williams 4490*.

Collected from Mexico through Central America and the West Indies to British Guiana, Venezuela, Colombia, and Peru.

This species is closely related to *A. salicariaefolia* H. & B. and also to *A. biflora* Benth. It differs from the former where the leaf-base is clasping and not narrowed and from the latter where the vesture is eglandular, and the size of which is much greater. Conceivably, intermediates may be collected uniting these three taxa.

Angelonia procumbens Nees ex Mart., Nova Acta Acad. Nat. Cur. 11: 45. 1823. *Physidium procumbens* Schrad., in Got. Gel. Ang. 714. 1821. *Schelveria arguta* Nees ex Mart., in Bot. Zeit. 1: 299, 328. 1821.

Subglabrous branched herb, sparsely puberulent on the 4-angled and winged branches, between the wings and on the very short, thickened petioles. Leaves opposite, upper occasionally subopposite, ovate, mostly subsessile, sometimes sessile, up to about 4.0 cm. long and 1.5 cm. wide, acute or long-acute, obtuse or rounded at base, margins serrate, especially upper three-fourths of blade, serrations appressed, primary veins usually apparent; flowers short-pedicellate, solitary or few-clustered, axillary; calyx enlarged at base, drying black, sepals sparsely, very short-ciliolate; anthers divaricate on very short filaments, style thickened, stigmas united, capitate.

San Martin: Juan Jui, Alto Río Huallaga, forest, about alt. 400 m., *Klug 3842*. (Kew Herb.)

Good flowers and mature fruit lacking. Only provisionally determined as an *Angelonia*. The stamens as usually occurring in this genus as well as the thickened style with capitate stigma seem to indicate this section of the family. The flowers are not resupinate as in *Alonsoa* R. & P. However, *Angelonia procumbens* Nees ex Mart. which this specimen so strongly resembles is a species of lowland southeastern Brazil (Bahia).

BACOPA Aubl.

Erect, repent or creeping herbs, sometimes forming mats, when erect up to about 60 cm. tall, glabrous to densely pubescent. Leaf

blades narrowly obovate to almost round, sessile or petiolate, from less than 1 cm. long to 5 cm. or little longer, margins entire to irregularly coarsely dentate, bases attenuate to broadly obtuse, apices long-acute to rounded, usually glabrous (except *B. salzmanni* Benth. with long, golden hair on tissue beneath near the base); flowers axillary, solitary, or occasionally few-clustered (*B. stricta* (Schrad.) Britt.), pedicellate (the pedicels ebracteolate or bibracteolate at base or apex, immediately below the calyx); sepals imbricate, 5, the 2 outermost (posterior) broadest, the lateral and anterior narrower, sometimes only a fifth as wide as the posterior, sometimes the posterior and lateral sepals much enlarged, often the larger sepals toothed, calyx tube wanting, the sepals often only loosely enveloping the flower and fruit; corolla tube cylindric to campanulate, lobes flattened or rounded, the throat open, lips mostly subequal, the upper (posterior) 2-lobed, the lobes united little higher than the 3-lobed lower (anterior) lip; stamens usually 4, didynamous, included in the tube, sometimes one or both of a pair (the smaller) with non-functional anthers, rarely one or both of the lower pair wanting, anthers stalked or sessile on the filament, when on stipes versatile, when sessile sagittate, versatile or dorsifixed, usually very small, about one-fourth to one-half the length of the filament; ovary ellipsoid, black or brown when dry, style little dilated at apex, usually a little longer than the ovary, stigma lobes at least partly distinct; capsule ellipsoid to broadly ellipsoid or subglobose, frequently shorter than the calyx, usually 2-valved, rarely 4-valved; seed numerous, testa reticulate; placenta columnar, little if at all thickened.

The genus (*Bacopa* the aboriginal name for *B. aquatica* Aubl., the type) is here treated in the broadest sense (*See*: Edwin, Fieldiana: Botany 31: no. 8, 227. 1967), containing 50–60 or more species, many very poorly collected and understood. Monographic revision employing all the means and methods at the disposal of today's worker is most necessary. The generic limits as well as the specific are in dispute. Distributed mostly in the warm regions (less in the temperate) of the world. Rare in Europe, uncommon in Africa, and sparsely represented in Australasia. Basically New World with greatest concentration in Brazil and with many species also in north-central and northeastern South America. A secondary center is present in Mexico. Four species have been collected thus far in Peru, two of which are rare.

1. Pedicels bibracteolate at apex.

2. Leaf blades with margins entire, often sessile, mostly not exceeding 1.5 cm. long, cuneate or obovate, with attenuate bases; margins of the outer 3 sepals entire; anthers sessile on the filaments, dorsifixed..... *B. monnieri.*

2. Leaf blades with coarsely toothed margins, petiolate, mostly more than 1.5 cm. long, up to 5.5 cm., mostly ovate or elliptically ovate; margins of the outer sepals sometimes toothed; anthers on short stipes, versatile..... *B. stricta.*

1. Pedicels ebracteolate or bibracteolate at base.

3. Stems densely pubescent; leaf blades sessile, clasping, almost connate, widest at the base, pubescent beneath with golden hair; pedicels ebracteolate; anthers sessile on the filaments, dorsifixed..... *B. salzmanni.*

3. Stems essentially glabrous; leaf blades short-petiolate, narrowed to base, glabrous; pedicels bibracteolate at base; anthers on short stipes, versatile..... *B. procumbens.*

Bacopa monnieri (L.) Wettst. in Engler and Prantl, Pflanzenf. IV(3b): 77. 1891. *Lysimachia monnieri* L., Cent. Plant. 2: 9. 1756. *Gratiola monniera* L., Amoen. Acad. 4: 306. 1759. *Calytriplex obovata* Ruiz & Pav., Prodr. 84. 1797. *Herpestis monnieri* HBK., Nov. Gen., et Sp. 2: 366. 1817. *H. procumbens* Spreng., Syst. Veg. 2: 802. 1825. *Bramia monnieri* (L.) Pennell, in Proc. Acad. Nat. Sci. Phila. 71: 243. 1920. Also *Limosella calycina* Forsk.; *Septas repens* Lour.; *Bramia indica* Lam.; *Monnieria brownei, M. africana,* and *M. pedunculosa* Pers.; *Herpestis cuneifolia* Michx.; *Habershamia cuneifolia* (Michx.) Raf. and others.[1]

Repent or prostrate often matting, glabrous herb of wet places, rarely floating on water. Leaves cuneate-obovate, attenuate to base, usually not exceeding 1.5 cm. long and 5–6 mm. wide, entire, sessile or almost so, apex rounded; internodes little longer or shorter than the leaves; flowers axillary, solitary, pedicellate, small, up to about 1.0 cm. long and 1.5 cm. wide when open, pedicels bibracteolate at apex, mostly not exceeding 1 cm. long, often only 6–7 mm. long (rarely long-pedicellate, ca. 2.0–2.5 cm.), erect, rarely reflexed; bracteoles linear to narrowly ellipsoid; sepals free, 4–5 mm. long, posterior (outer) pair about 2.5–3.0 mm. wide, lateral sepal 1.5–2.0 mm.

[1] Full synonymy with extended citations for this taxon can serve no useful purpose at this time. The synonyms supplied are believed to be sufficient to indicate both the nomenclatural and taxonomic disputes still prevalent in the *Gratiolae* generally and this taxon in particular.

wide, anterior pair less than 0.7 mm. wide, often not reaching 0.5 mm., outer and lateral ovate or elliptic-ovate, inner linear; corolla zygomorphic, bilabiate, tube shorter than the calyx, included, yellowish within, cylindric-campanulate, the white to pink to lavender or blue lobes little shorter than the tube, posterior pair little longer than the anterior three lobes, the posterior lobes united little more than the anterior, entire corolla about 6–9 mm. long; stamens 4, didynamous, anthers about one-half as long as the filaments, sessile, sagittate, dorsifixed; ovary ellipsoid, shorter than the corolla tube and the 3.5–4.5 mm. long style, stigma 2-lobed, lobes coronate or punctiform; capsule ellipsoid or ellipsoid-ovoid, septically dehiscent.

Cajamarca: *Osgood* and *Anderson 37*.—Huanuco: Prov. Huanuco, Huacho, 8 km. N. of Huanuco, 1,920 m. alt., *Stork & Horton 9413*; 7,000 ft., *Macbride 3223*.—Lima: Chancay, Seaside cliff, *Stork 9364*; Callao, *Macbride 5884*; Miraflores, *Pennell 14284*; *Vargas 1232*; Sin Prov.: near Viscas, *Pennell 14446*.—Piura: Negritos, *Haught 126*;[1] E. of Cape Parinas, *Haught 126*.[1]

Greatest concentration is the Southern United States, not uncommon in Mexico, Central America, and the West Indies, sporadic in South America to Paraguay and Brazil, rare in Malaya, Iraq, and the Philippine Islands.

Bacopa procumbens (Mill.) Greenm., Field Mus. Bot. 2: 261. 1907. *Erinus procumbens* Miller, Gard. Dict. VIII (6). 1768 and IX (13). 1797. *Lindernia dianthera* Sw., Prodr. 92. 1788; Miller Gard. Dict. IX (2). 1797; Willd., Sp. Pl. 3: 326. 1800. *Herpestis colubrina* HBK., Nov. Gen. et Sp. 2: 368. 1818. *H. chamaidryoides* HBK., Nov. Gen. et Sp. 2: 369. 1818; Benth. in DC., Prodr. 10: 393. 1846. *H. peduncularis* Benth. in Comp. Bot. Mag. 2: 56. 1836; Benth. in DC., Prodr. 10: 394. 1846. *Bacopa chamaidryoides* Wettst. in Engler & Prantl, Pflanzenf. IV(3b): 76. 1895. Also *Monniera dianthera* Millsp. (comb. nov. only, not as to specimens); *Mecardonia procumbens* Small; *M. viridis* Small; *M. tenuis* Small; *Pagesia peduncularis* (Benth.) Pennell; *P. procumbens* (Miller) Pennell; *P. dianthera* (Sw.) Pennell; *Bacopa dianthera* (Sw.) Descole & Borsini.

Glabrous, upright or prostrate herb, when prostrate sometimes forming mats, usually blackening when dry. Stems terete, much branched from the base; leaves mostly ovate or elliptically ovate,

[1] The labels, data, and number of these collections are mixed or duplicated. While these two sheets may comprise but one collection it is best to consider them distinct. That the material was collected in Depto. Piura seems clear.

dimidiately-attenuate to the petiole, up to 3.4 cm. long and 1.2 cm. wide, usually about 1.5–2.5 cm. long and 0.6–1.0 cm. wide; margins dentate or serrate-dentate on upper three-fourths of blade, acute; petiole up to 1 cm. long, narrowly winged; flowers axillary, solitary; pedicels lax, up to 2.5 cm. long, usually at least 2 times longer than the flowers, bibracteolate at base; bracteoles narrowly lance-ovate, short-petiolate; sepals very little united, ca. 0.5 mm. or (usually) completely free, 6–8 mm. long, three outermost ovate, broadest, often with toothed margins, two innermost narrow, almost linear, entire, all sepals acute, innermost occasionally acuminate; corolla yellow, 8–10 mm. long, tube included in the calyx, the short lobes exserted but only little exceeding the calyx, upper lip of 2 lobes, glabrous within, lower of 3 lobes or the lowermost 2 lobes united, internally with club-shaped hairs in or near the throat; stamens 4, didynamous, anthers on very short stipes, about one-fifth to one-third the length of the 2–3 mm. long filament, versatile; ovary ellipsoid, included in or only little exceeding the frequently papery calyx, septicidal.

Sporadic in Central to Northeastern Peru.

Junín: Above San Ramon, Hacienda Schunke, 1,300–1,700 m., *Schunke A9*; About 4,000 ft., *Macbride 5670*; Mito, 9,000 ft., *Macbride & Featherstone 1417*.—Loreto: above Pongo de Manseriche, alt. 200 m., *Mexia 6173*.—San Martin: San Roque, alt. 1,300–1,500 m., *Ll. Williams 7148*.—Sin Dept.: in Montanis Peruviae, *Haenke 1900*.

Widely distributed in the warm temperate and tropical zones of the New World, from sea-level to 9,000 ft. or more elevation. In usually drier sites than the preceding species, sometimes a garden weed. Most abundant in Central America and Mexico, common in the southern United States. Rarer in the West Indies. Sporadic in South America in Brazil, Ecuador, Colombia and one collection seen from Paraguay.

There is reasonable expectation that further collecting, especially from the Eastern slopes of the Andes and from lowland Peru will result in uncovering at least some if not all of the following species, known from Brazil, Venezuela, and Colombia: *B. aquatica* Aubl., *B. lilacina* (Pennell) Standl., *B. reptans*, and *B. ranaria* Benth., known also from widespread Central America collections. In addition, three others can be expected, at present well represented in Central America: *B. parviflora* Standl., *B. reflexa*, and *B. sessiliflora* Edwall.

Bacopa salzmannii (Benth.) Wettst. in Engler & Prantl, Pflanzenf. IV(3b): 76. 1895. *Herpestis salzmannii* Benth., in Comp. Bot. Mag. 2: 58. 1836.

Erect or reclining herb, stems soft, densely beset with golden hairs, the internodes often 2 or more times longer than the sessile to clasping leaf blades (internodes much shortened near the apex). Leaves ovate-orbicular, up to about 1 cm. long and wide, almost connate, margins entire or microscopically distantly crenulate, densely beset with golden hairs beneath, near the base and on the lower half of the tissue; flowers solitary, axillary on long, recurved, golden-pubescent, ebracteolate pedicels; pedicels up to 3–4 times longer than the calyx; flowers up to about 7 mm. long, not as wide; calyx up to 5 mm. long, sepals free, outermost 2 broadly ovate, cordate at base, acute to subobtuse at apex, inner sepals much narrower, little shorter; corolla white or creamy white, only little exceeding the calyx, tube much longer than the very short lobes; stamens 4, included in the corolla tube, didynamous, filament pairs little to very different in length, anthers sessile, subsagittate, dorsifixed, varying from less than to more than one-half the length of the filaments, ovary only about 1.5 mm. long, ellipsoid, style about 2 times as long as the ovary, stigma lobes distinct, lamellate; capsule ellipsoid, included in the calyx, septicidal.

Rare in Peru. Lima: Lima, Callao, alt. about 8 ft., *Macbride 5987*.

A Central American species, where it is polymorphic. Common in boggy and other wet sites from British Honduras to Panama; not infrequent in Mexico. Found sporadically in South America in Colombia, Bolivia, and Brazil.

This taxon varies widely in habit; from erect and unbranched to branched, repent, creeping, matted and prostrate. The latter conditions would be expected in Peru.

Bacopa stricta (Schrad.) Edwall, Bol. Conn. Georgr. São Paulo 13: 176, 180. 1897. *Herpestis stricta* Schrad. in Link, Enum. 2: 142. 1822. *H. domingensis* Spreng., Syst. 2: 801. 1825. *H. polyantha* Benth., Comp. Bot. Mag. 2: 57. 1836. *Mella* Vandelli, Fl. Lusit. 43, *fig. 23*. 1788. Generic description only, no generotype indicated. This name is often a sectional or subgeneric designation of *Bacopa* (or *Herpestis*) of authors, the section to which this species and *B. salzmannii* Benth. pertain.

Erect, subglabrous herb, stems terete or quadrangular, soft, usually sparsely and finely, very short-puberulent above. Leaves glabrous, petiolate, blades up to 6 cm. long and 2 cm. wide, usually smaller, decreasing base to apex, ovate or elliptically ovate, narrowed to long-acute bases and apices, occasionally apices subacuminate, margins coarsely, irregularly dentate or serrate, venation pinnate, apparent above and beneath; flowers small, up to about 8 mm. long, usually solitary or few-clustered in leaf-axils, sometimes in short, raceme-like inflorescences or racemes, pedicellate, dispersed often from near the base of the plant to the apex; pedicels more or less densely to sparsely pubescent, usually about as long as the calyces or a little longer, shorter when the flower is immature, bibracteolate near the apex; bracteoles linear, ca. 1 mm. long; calyx often dark red in life, up to about 6 mm. long, usually 4–5 mm. posterior and lateral sepals ovate, margins often soft-ciliate or ciliolate, acute, tube wanting; corolla up to 8 mm. long, not as wide, lobes only little exceeding the calyx in length, tube and lobes white, tube internally marked with yellow or blue near the throat; stamens 4, didynamous included in the tube, anthers very small, often disposed on short stipes (visible only at 20 × magnification or more) versatile, stipes sometimes suppressed then anthers contiguous, dorsifixed; style thick, much longer than the 1–2 mm., ellipsoid ovary, stigma lobes wholly free; capsule septicidal, short, ca. 3–5 mm. long, ovoid to ovoid-subglobose, style frequently persisting.

Rare in Peru, only one collection seen, San Martín: San Roque, 1,300–1,500 m., *Ll. Williams 7165*.

Sporadic and infrequent in South America; found also in Colombia, Venezuela, Brazil, and Ecuador. Rare in the West Indies.

BARTSIA L.

Bartsia L., Gen. Pl. 262. 1754; Benth. in DC., Prodr. 10: 544. 1846. *Trixago* Stev., Mem. Soc. Mosc. 6: 4. 1823. *Parentucellia* Viv., Fl. Lib. Spec. 31, *t. 21, f. 3*. 1824. *Eufragia* Griseb., Spicil. Fl. Rumel. 2: 13. 1844. *Alicosta* Dulac., Fl. Hautes-Pyr. 381. 1867.

Annual or perennial herbs, sometimes subshrubs, usually variously pubescent and often glandular, erect to prostrate, usually branched. Leaves usually opposite, occasionally alternate, the lower often with axillary leaflets, mostly toothed, usually narrow (to ovate), many times longer than wide, most often sessile and the apex obtuse, upper frequently cordate-amplexicaul; bracts similar to cauline or

modified, entire, subentire and narrower; flowers mostly 8–28 mm. long, forming spikes or racemes, rarely solitary and axillary; calyx tubular or campanulate, 4-lobed; corolla galeate, galea usually longer than the 3-lobed lower lip, occasionally shorter, mostly glandular-pubescent, sometimes glands wanting, rarely glabrous; lobes of the lip erect or patent; throat occasionally with a small palate, tube mostly longer than the lips; stamens 4, didynamous, with the style included in the galea, filaments often with minute sessile glands, anthers usually long-pubescent, most often basally mucronate or apiculate; stigma exserted, lobes united or rarely partially distinct, ovary rarely glabrous, usually densely beset with stiff, long, golden hair; capsule with vesture as the ovary, narrowly ellipsoid to ovoid, little shorter to twice the length of the calyx, apically usually obtuse, emarginate, apiculate; seeds numerous, minute, testa closely adherent, surface many-striate-sulcatulate.

The genus has an unusual and disjunct distribution. One species each in North America and Australia; between five and ten in Europe and Africa. The center of concentration is in Andean South America with about 50 species of which 32 are found in Peru. A number of taxa most probably remain to be described, especially in Africa and South America.

1. Corolla externally glabrous or sparsely hispidulous.
   2. Galea equal to or longer than the lower lip of the corolla. *B. elongata.*
   2. Galea shorter than the lower lip of the corolla.
      3. Leaf blade with entire margins ..... *B. integrifolia.*
      3. Most of the leaf blade margins grossly toothed .... *B. aurea.*
1. Corolla especially the galea, externally puberulent or pubescent and often glandular.
   4. Calyx 18–20 mm. long; corolla brown ..... *B. peruviana.*
   4. Calyx less than 18 mm. long; corolla yellow or red, less often white or purple.
      5. Anthers glabrous or very sparsely hispidulous.
         6. Corolla tube shorter than the lips ..... *B. calycina.*
         6. Corolla tube equal to or longer than the lips.
            7. Galea equal to or longer than the lower lip.
               8. Pedicels of mature flowers 2–3 mm. long or longer.
                  9. Anthers blunt at the lower end, without mucra or acumina ..... *B. mutica.*

9. Anthers mucronate or acuminate at the lower end. *B. pedicularioides.*

8. Pedicels of mature flowers less than 2 mm. long.

10. Bract margins with few to many rounded extrorse teeth or lobes; calyx usually glandular.

11. Plants erect, elongate, galea puberulent or when glandular-pubescent, glands long-stalked..... *B. santolinaefolia.*

11. Plants dwarf, often procumbent; galea glandular-pubescent, glands subsessile.. *B. diffusa.*

10. Bract margins with small, sharp antrorse lobes; calyx eglandular..... *B. biloba.*

7. Galea shorter than the lower lip.

12. Leaf blades most often lance-ovate, oblong or variously obovate; bracts ovate or obovate.

13. Blades mostly oblong to lance-ovate.

14. Stems suberect or ascending, clustered or branching from the base; plants dwarf, usually less than 20 cm. tall..... *B. diffusa.*

14. Stems erect, solitary, branching above the base, elongate, much more than 20 cm. tall. *B. mutica.*

13. Blades and bracts variously obovate. *B. simulans.*

12. Leaf blades linear; bracts linear, oblong-linear or narrowly lance-subovate..... *B. curtiflora.*

5. Anthers distinctly pubescent with mostly long and curled or matted hair.

15. Galea shorter than the lower lip of the corolla.

16. Corolla tube about as long as the lips.

17. Calyx lobes acute, shorter than the tube... *B. aurea.*

17. Calyx lobes obtuse or subobtuse, usually as long as the tube or longer, rarely when shorter margins crenate..... *B. diffusa.*

16. Corolla tube longer than the lips.

18. Calyx lobes obtuse; plants straggling, suberect, or erect.

19. Galea little shorter than the lip; bracts ovate; plants suberect-ascending, dwarfed..*E. diffusa.*

19. Galea about one-half as long as lower lip; bracts oblong or elliptical; plant elongate, erect. *B. meyeniana.*

18. Calyx lobes acute; plants usually erect.

20. Calyx lobes narrow, linear or little wider, mostly as long as or longer than the tube.

21. Pubescence cinerous or canescent, appressed, mostly eglandular; bracts usually entire, linear or narrowly lanceolate.....*B. canescens.*

21. Pubescence golden or white or brown, often glandular; bracts usually toothed, broader than linear.....*B. bartsioides.*

20. Calyx lobes lance-triangular, lance-ovate or narrowly ovate or oblong, usually shorter than the tube.

22. Tube of the 9–12 mm. long corolla more than half included in the calyx.....*B. curtiflora.*

22. Tube of the 13–22 (–26) mm. long corolla more than half exserted from the calyx. *B. anomala.*

15. Galea equaling to 2–3 times longer than the lower lip of the corolla.

23. Galea equaling to up to a fourth longer than the lip.

24. Corolla tube shorter than and included in the calyx, usually equaling to sometimes shorter than the lips of the corolla.....*B. subinclusa.*

24. Corolla tube exserted and longer than the calyx and most often longer than the corolla lips.

25. Bracts entire or with a few pairs (up to 4) of distant often obscure teeth.

26. Calyx cleft more deeply medianly than laterally, cleavages very short, lobes very unequal. *B. biloba.*

26. Calyx cleft equally medianly and laterally, lobes equal or almost so.

27. Flowers ca. 10 mm. long; calyx lobes deltoid-triangular.....*B. parvifolia.*

27. Flowers 13–18 (–20) mm. long; calyx lobes linear or lance-linear. . . . . *B. bartsioides.*

25. Bracts with several pairs of close, often obtuse or rounded teeth.

28. Flowers up to 13 mm. long, rarely reaching 15 mm., usually 8–11 mm.; calyx lobes most often much shorter than the tube.

29. Dwarf, often less than 2 cm. tall, deep-rooted, decumbent to suberect plants, usually branching from the base, frequently stems clustered. . . . . *B. diffusa.*

29. Elongate, more than 2 cm. tall, shallow-rooted, erect plants, branching from well above the base or unbranched, stems solitary.

30. Foliage and fruit glabrous or subglabrous, the few hairs when present on the fruit, white; corolla whitish; stems unbranched. *B. glabra.*

30. Foliage and fruit more or less densely pubescent, the fruit beset apically with golden hair; corolla yellow, pink or purple; stems most frequently branched.

31. Pubescence hispid, hard. . . *B. hispida.*

31. Pubescence pilose, soft. *B. santolinaefolia.*

28. Flowers mostly 15–16 (–20) mm. long; calyx lobes only little shorter to equalling the tube. *B. bartsioides.*

23. Galea more than a fourth longer than the lip, up to 2–3 times longer.

32. At least most of the flowers less than 14 mm. long.

33. Corolla tube equal to or shorter than the lips.

34. Calyx lobes subacute or obtuse.

35. Calyx lobes crenate. . . . . *B. filiformis.*

35. Calyx lobes entire. . . . . *B. orthocarpiflora.*

34. Calyx lobes acute, pubescence stiff (hispid). *B. elachophylla.*

33. Corolla tube longer than the lips.
    36. Bracts longer than the flowers.
        37. Stem glandular-hispid above; calyx teeth triangular; pedicels less than 3 mm. long. *B. brachyantha.*
        37. Stems with stiff, multicellular, pointed hair; calyx teeth broadly ovate; pedicels often 3 mm. long..... *B. duripilis.*
    36. Bracts shorter than the flowers.
        38. Plants caespitose..... *B. sanguinea.*
        38. Stems not tufted, either branched or unbranched.
            39. Flowers and fruit on erect pedicels up to 7 (–8) mm. long..... *B. pedicellata.*
            39. Flowers and fruit sessile or subsessile; pedicels neither erect nor exceeding 3 mm. long.
                40. Calyx lobes crenate..... *B. filiformis.*
                40. Calyx lobes entire.
                    41. Flowers white or whitish, or yellow or red; calyx lobes oblong, obtuse.
                        42. Corolla about 2 times as long as the calyx, anthers sparsely, galea little more, pubescent; galea up to 2 times longer than the lip. *B. glabra.*
                        42. Corolla about 3 times longer than the calyx; anthers and galea densely pubescent; galea about 3 times longer than the lip. *B. orthocarpiflora.*
                    41. Flowers green; calyx lobes lance-triangular, acute..... *B. viridis.*

32. At least most of the flowers more than 14 mm. long.
    43. Corolla tube equal to or shorter than the lips.
        44. Flowers on filiform pedicels, 5–10 mm. long; galea up to about 2 times longer than the lip. *B. weberbaueri.*

44. Flowers sessile or on thicker and shorter pedicels, up to 4 mm. long; galea about 3 times longer than the lip. . . . . *B. orthocarpiflora.*

43. Corolla tube longer than the lips.

45. Leaves glabrous except for marginal articulated, 1 mm. long hair; stems solitary. . *B. trichophylla.*

45. Leaves usually pubescent on tissue and veins, marginal hair present or lacking, when present not articulated; when leaves glabrous, stems clustered or tufted.

46. Galea usually deeply emarginate or obcordate; pubescence stiff, usually 2-celled. *B. altissima.*

46. Galea entire or merely faintly emarginate at apex; pubescence otherwise.

47. Stems caespitose, basally branched. *B. sanguinea.*

47. Stems solitary, not branching from the base.

48. Flowers frequently 2 cm. long or longer; galea up to 2 times the length of the lip. *B. inaequalis.*

48. Flowers up to 16 mm. long; galea about 3 times the length of the lip. *B. orthocarpiflora.*

Bartsia altissima Rusby, Phytologia 1: 75–76. 1934.

Upright (very) densely hispid herb, stems much branched and sulcate, pubescence often clustered, the trichomes usually swollen at the base and usually 2-celled, occasionally 1-celled, retrorse. Leaves sessile, clasping, broadest at the base, lance oblong, up to more than 2 cm. long and almost or quite 1 cm. wide, coarsely crenate-dentate, the teeth rounded-obtuse, the sinuses narrow, apex obtuse, veins very apparent beneath, the costa often keeled, the pubescence frequently clustered here and on the secondary veins, these 4–5 pairs; spikes short, few-flowered, interrupted, short-pedicellate; pedicels ca. 3–4 mm. long; calyx 7–10 mm. long, tube campanulate, lobes unequally, broadly triangular, acute, shorter than the tube; corolla red or dark brown-red, pubescent inside and outside, 15–18 mm. long, tube a little longer than the galea, throat swollen, galea about 2 times

longer than the lip, usually deeply (for the genus) obcordate or emarginate, lobes on the lips ovate; anthers lanate, mucronate; style very short, puberulent apically, stigma lobes united, at least partly, most often wholly, ovary densely beset with long, stiff, golden hair; capsule densely pubescent as the ovary, ellipsoid or ovoid, blunt at apex, a little longer than the calyx, style persisting.

Ayacucho: Between Huanta and Hacienda Pargora, alt. 4,200 m., *Killip & Smith 23301*; Huanta, Punas above Huanta, alt. 12,000–13,000 ft., *Pearce s.n.*—Cuzco: Paucartambo to Tres Cruces, Cerro de Cusilluyoc, thickets and rocky banks, alt. 3,400–3,600 m., *Pennell 13810*; Pillahuata, Cerro de Cusilluyoc, thickets in valley of Río Pillahuata, alt. 2,300–3,000 m., *Pennell 13926*; Lares Prov., at Lares, alt. 3,200 m., *Marin 2307*.

Type from Bolivia (Pongo) at 12,000 ft. The Peruvian material differs in having unbranched hairs and a larger calyx but is clearly the same taxon. Rusby's specimen apparently had no corollas or fruit suitable for description.

Bartsia anomala Edwin, Phytologia 19: 362. 1970.

Perennial herb, usually pubescent, occasionally merely puberulent on stems branches and foliage, erect, sometimes branching from the base. Leaves linear to lanceolate, crenate, slightly bullate, obtuse, narrowed to base, sessile; inflorescences spikes, usually lax and basally interrupted; pedicels 1.0–2.5 mm. long; bracts usually as the leaves, except margins distantly crenulate to almost entire, especially near the apices of the branches; flowers 13–22 (–26) mm. long, corolla yellow or lower lip occasionally red to purple; calyx 8–11 mm. long, tubular, the acute, narrowly lance-oblong or lance-triangular lobes shorter than the tube; corolla tube longer than the lips, over one-half exserted, galea shorter than the lower lip whose lobes are oblong, rounded; filaments glabrous or with a few, minute, sessile, scattered glands, anthers pubescent, mucronate at base; stigma lobes united, style minutely, sparsely puberulent, ovary densely beset with long, stiff, golden hair; capsule usually shorter than the calyx, occasionally about equal to the calyx, ellipsoid-ovoid, obtuse, apiculate, pubescent on the upper half, as the ovary.

Ancash: Cordillera Blanca, alt. 4,000 m., Kinsl. P2298.—Cajamarca: S.W. of Paso de Gavilán, S. of Cajamarca, alt. 2,700–2,750 m., *Pennell & Anderson 15104*.—Cuzco: Limestone, open ground, alt. 11,300 ft., *Gourlay 96*; Prov. Anta, alt. 3,200 m., *Herrera 3629*, Cerro de Colquepata, rocky slope on trail from Paucartambo to Vilcanota,

alt. 3,400–3,700 m., *Pennell 14176*.—Huancavelica: Prov. Tayacaja, Hills N. of Pampas, alt. 3,200 m., *Stork & Horton 10247*.

This species differs from all other Bartsias by the combination of the following characters: galea shorter than the lip and lanceolate-oblong or lance-triangular, calyx lobes that are acute and clearly shorter than the calyx tube as well as relatively long, much exserted corollas.

The taxon appears sporadically over much of Andean Peru.

Bartsia aurea Edwin, Phytologia 19: 363. 1970.

Perennial (?) herb, up to 30 cm. tall, stems and branches lanate, oldest stems excepted, branching from the base, main branches erect or soon ascending. Leaves densely pubescent, sessile on the stems and branches, oblong-linear, up to 4 mm. long, the bracteate blades narrowly lance-ovate or linear, 5–7 mm. long, margins remotely crenate, apex obtuse, base occasionally a little narrowed; spikes apical, up to 4.5 cm. long, lax or subdense; bracts almost as long as the calyx, with a few, distant pairs of marginal teeth; pedicels lacking or up to 1.5 mm. long; calyx cylindric, 7–8 mm. long, densely pubescent, eglandular or almost so, tube usually a little longer than the narrowly lance-ovate, acute lobes; corolla yellow, 9–10 mm. long, tube a little longer than the lips, galea glabrous to puberulent, shorter than the lip (about one-half as long), lobes of the lip spreading, unequal, elliptically ovate, the median much longer and a little narrower than the lateral; filaments inserted near the base of the corolla tube, apically sparsely glandular with sessile glands, anthers sparsely to less often densely long-pubescent, basally acuminate; style puberulent on upper half, stigma-lobes united, punctiform, ovary densely beset with long, stiff, golden hairs; fruit unknown.

Cuzco: Paucartambo, open, rocky slopes SSW. of Paucartambo, alt. 3,200–3,400 m., *Pennell 14171*. The only collection.

Stems slender and with a grey cast when dry. The combination of the galea much shorter than the lip and also glabrous or sparsely puberulent, yellow corolla and unequal lobing of the lower lip, as well as the small size of the corolla separates this taxon from all other Bartsias.

Bartsia bartsioides (Hook.) Edwin, comb. nov. *Lamourouxia bartsioides* Hook., Bot. Misc. 2: 234. 1831. *Bartsia densiflora* Benth. in DC., Prodr. 10: 548. 1846; Wedd. Chl. And. Nov. 2: 130. 1860. *Bartsia thiantha* Diels in Engler, Bot. 37: 432. 1906.

Perennial, stems erect and branched, often reflexed-hispid, occasionally hair softer, plants pubescent and glandular-pubescent. Leaves linear, linear-lanceolate, oblong or linear-oblong, up to more than 3 cm. long, most often between 1.0–2.5 cm. and up to 8 mm. wide, frequently not exceeding 5 mm., crenate or dentate, often bullate, margins plane or little revolute, obtuse, clasping at the sessile base; flowers (13–)15–18(–20) mm. long, in usually dense spikes, yellow or purple and yellow, very rarely white, sometimes different colored flowers on one plant; bracts about as long as the calyx, margins entire or subentire to closely toothed, the teeth rounded-obtuse or less often acute; calyces 8–12 mm. long, inflated, lobes acute, little shorter to most often about equal in length to the tube, linear to less often very narrowly triangular; corolla tube usually a little exserted, sometimes equal to the calyx, longer than the lips, galea little shorter to little longer than the lip, glandular-pubescent; anthers pubescent, basally mucronulate, filaments sparsely glandular, the minute glands with a bulbous base, abruptly narrowed to a linear apiculum; stigma sparsely puberulent, ovary densely pubescent, hairs stiff, long and golden; capsule ellipsoid-ovoid, little shorter to as long as the calyx, pubescent as the ovary but less densely, apex obtuse, apiculate.

By far the commonest *Bartsia* in Peru and one of the most frequently encountered in the central and southern Andes Mountains. In Peru from Ancash to Puno at higher elevations.

Ancash: Above Laguna de Llanganuco, 25 km. E. of Yungay, alt. 4,000 m., *Edwin 3806*.—Apurimac: Cordillera Salcantay, alt. 4,300 m., *Rauh-Hirsch P 1400*; Prov. Andahuaylas, alt. 2,700 m., *Stork & Horton 10682*.—Arequipa: Prov. Moquegua, Saylapa near Carumas, alt. 3,600–3,700 m., *Weberbauer 7347*; Nevado de Chachani, alt. 3,200–3,600 m., *Pennell 13256*; Arequipa, alt. 3,100–3,300 m., *Pennell 14276*.—Ayacucho: Prov. Parinacochas, below Caucala, alt. 3,200–3,300 m., *Weberbauer 5784*.—Cuzco: Colinas de Laxaihuáman, alt. 3,600 m., *Herrera 2374*; Cordilleras del Pachahuasán, alt. 4,400 m., *Herrera 2575*; Tambomachay, alt. 3,800 m., *Marin 1417*; Sacsahuamán, above Cuzco, alt. 3,500–3,600 m., *Pennell 13697*; Cuzco, on trail to Pisac, alt. 3,500–3,600 m., *Pennell 13697*; Corapampa between Cuzco and Pisac, alt. 3,500–3,600 m., *Pennell 13704*; Cerro de Cusilluyoc, alt. 3,400–3,3900 m., *Pennell 13811*; Cordillera Veronica, *Rauh-Hirsch P 966*; Ausangate, alt. 4,700 m., *Rauh-Hirsch P 1150*; *Soukup 572*; alt. 12,500 ft., *Stafford 797*; Parugo, alt. 3,800 m., *Vargas 894*; Canas, Asuncíon Bridge, alt. 3,720 m., *Vargas 11034*; Prov. Urubamba, alt. 2,850 m., *Vargas 1156*.—Junin: Prov. Huan-

cayo, alt. 3,400 m., *Stork & Horton 10219*.—Lima: Matucana, alt. 800 ft., *Macbride & Featherstone 429*; Canta, alt. 2,700–3,200 m., *Pennell 14334*; Río Chillon, above Obrajillo, alt. 2,800–3,300 m., *Pennell 14428*; San Buenaventura, alt. 2,700–3,700 m., *Pennell 14621*; alt. 3,600–3,800 m., *Pennell 14641*; Huaros, alt. 3,200–3,600 m., *Pennell 14707*.—Puno: Lake Titicaca, alt. 4,000 m., *Mannheim M 70*; *M 137*; alt. 400 m., *Soukup 103*; *303*; Putina, Azangaro, *Soukup 970*. —Sin. Dept.: *Haenke 1981*; Sin. Loc.: *Ruiz & Pavon s.n.*; *Soukup 1190*.

Bartsia biloba Wedd., Chl. And. Nov. 2: 123. 1860.

Annual up to about 11–12 cm. tall, stems simple or branched from the base, ascending, hispid, the hairs tending to aggregate in more or less thick, definite lines. Leaves mostly oblong-lanceolate, up to 9 mm. long and about 1–2 mm. wide, hispidulous, crenate-bullate, obtuse, at least the lower a little narrowed to the sessile base; spikes more or less lax, appearing subdense in fruit, interrupted; pedicels up to 2 mm. long, thickened; flowers up to 11 mm. long; calyx campanulate-oblong, pubescent, 5–7 mm. long, tube much longer than the lobes, cleft more deeply medianly than laterally; lobes unequal, the lateral shorter than the median and than the tube, acute; corolla "drab" purple, tube little longer than the calyx, and corolla lips; galea concave at apex, densely tomentose, little longer than the lip whose short lobes are ovate-rounded; filaments glandular (30x), anthers sparsely pilose or glabrous, mucronate at base; style glabrous, stigma lobes united, ovary beset with long, stiff, golden hair; capsule ovate, acute, pubescent as the ovary, about as long as the calyx.

Cuzco: Paso de Trés Cruces, Cerro de Cusilluyoc, alt. 3,800–3,900 m., open grassy paramo, *Pennell 13818*.

The type also from Cuzco, not seen.

The unequally cleft calyx quickly and clearly delimits this taxon.

Bartsia brachyantha Diels., Bot. Jahrb. 37: 431. 1906.

Subshrub with stems up to 9.5 m. tall, angled, glandular-hispid above. Leaves twining from the base, ovate or oblong, flattened, crenate-serrate, hispid, 2–3 cm. long and 1.0–1.2 cm. wide; floral leaves exceeding the flowers; spike interrupted; flowers very short-pedicellate; calyx tube subscarious, 4–5 mm. long, teeth triangular, very hispid, 4 mm. long; corolla purplish-blotched, pubescent, tube 5 mm. long and 3.5 mm. wide, galea 4 mm. long, lip 2 mm. long; anthers pilose. (After original description.)

Sin. Dept.: Above Cuyocuyo, alt. 3,600–3,800 m., *Weberbauer 919*. (Material not seen.)

Bartsia calycina Diels., Bot. Jahrb. 37: 432. 1906.

Laxly branched subshrub, up to 50 cm. tall, branches dark purple, with the leaves glandular-hispidulous above. Cauline leaves patent, dilated at base, lance-ovate, conspicuously bullate-crenate, 18–22 mm. long and 2–4 mm. wide, none smaller; floral leaves a little smaller, acute, usually entire, exceeding the flowers; calyx glandular, teeth linear-lanceolate, very acute, 2 times longer than the tube, about 10 mm. long; corolla purple, tube about 6 mm. long, galea 7 mm. long, lip 8 mm. long, internally deep yellow; anthers glabrous. (After original description.)

Ancash: Between Samanco and Caraz near Cajabamba, alt. 3,000–3,500 m., *Weberbauer 3166*. (Material not seen.)

Bartsia canescens Wedd., Chl. And. Nov. 2: 123. 1860.

Perennial or annual herb, with usually much branched, clustered, canescent-hispidulous stems. Leaves linear-oblong, hispid, sessile, 4–8 mm. long and 1–2 mm. wide, eglandular as the stems and branches, crenate and plane to entire and revolute, obtuse, not narrowed to base; spikes few-flowered, lax; flowers sessile or subsessile; calyx 9–11 mm. long, ovate-oblong, glandular-hispid, lobes linear, entire, acute almost equaling the length of the tube; corolla 12–18 mm. long, tube exserted, longer than the lips, galea yellow, lip reddish; galea glandular-hispid, usually a little shorter than the subglabrous or glabrous lip, rarely equaling its length, lip erect, lobes unequal, median bigger than the lateral, rounded; filaments glabrous, anthers pilose, basally acuminate; style pubescent above, stigma lobes united, punctiform, ovary narrowly ellipsoid, beset with long, stiff, golden hair; capsule apically pubescent, about as long as the enveloping calyx.

Apurimac: Prov. Andahuaylas, Pincos, alt. 2,700 m., *Stork & Horton 10686*.—Ayacucho: *Weberbauer 5516*.—Cuzco: *Gay s.n.* (not seen).—Lima: *Dombey s.n.*

Bartsia curtiflora Edwin, Phytologia 19: 363. 1970.

Erect or ascending, dwarf to 35 cm. tall, usually perennial, rarely annual herb, usually branching from the base, densely pubescent, the inflorescence often glandular-pubescent on stems, calyx and corolla. Leaves linear to narrowly lance-subovate, only rarely exceed-

ing 1.2 cm. long, usually less than 1.0 cm. long and 1–3(–4) mm. wide, subentire to crenulate, plane or little revolute, obtuse, narrowed or not to the sessile, clasping base; inflorescences long or short, usually dense, occasionally lax, often interrupted below, spikes or spike-like; pedicels up to 2 mm. long; bracts linear and few-toothed to lance-subovate and more or less closely crenulate; calyx tubular-funnelform, 7–8 mm. long, lobes lanceolate or narrowly lance-oblong or triangular, a little shorter to about equaling the length of the tube, acute; corolla usually yellow, 9–12 mm. long, tube from more than one-half to almost entirely included, longer than the lips, galea a little shorter than the lip; filaments sparsely glandular on upper one-half with sessile glands, anthers glabrous to more or less densely long-pubescent, basally acuminate; stigma lobes united, style puberulent over its entire length, ovary densely stiff, golden pubescent; capsule longer than the calyx, oblong to ellipsoid-ovoid, obtuse with a sharp apiculum, the style persisting or deciduous.

Arequipa: Pichu Pichu, alt. 13,500 ft., *Stafford 810*.—Cuzco: Prov. Anta, alt. 3,200 m., *Herrera 3625*; *3626*; *3627b*; alt. 3,450 m., *Vargas 296*; Cuzco: Ollantaitambo, open rocky slope, alt. 3,000–3,100 m., *Pennell 13643*.—Lima: Río Blanco, alt. 3,000–3,500 m., *Killip & Smith 21633*.—Puno: Araranca, alt. 4,100–4,300 m., *Pennell 13433*.

This species differs from all other *Bartsias* by the combination of the following characters: galea shorter than the lip, bracts linear to narrowly lance-subovate as are the leaves, corolla tube largely included in the calyx, the anthers sometimes glabrous and the narrow acute calyx teeth that are as long or almost as long as the calyx tube.

Bartsia diffusa Benth. in DC., Prodr. 10: 546. 1846. *B. pumila* Benth. l.c. 546.

Subshrub, dwarf to about 20 cm. tall, decumbent to ascending, diffusely branched from the base, sometimes stems clustered, pubescent to glandular-pubescent and often viscose. Leaves oblong to lance-ovate or narrowly ovate, 4–11 mm. long, bullate-crenate, obtuse at apex, little narrowed to the sessile base; inflorescences dense, usually glandular-pubescent spikes; bracts ovate or obovate, margins obtusely toothed; pedicels only rarely reaching 2 mm. long; flowers 8–11(–13) mm. long, yellow, less often yellow and red or red; calyx tubular-campanulate, lobes obtuse, usually longer than the tube, entire, occasionally shorter than the tube, crenulate; corolla tube usually exserted, a little longer than the lips, rarely only equal to the

lips, galea most often shorter than the lower lip, occasionally varying to a little longer, glandular-pubescent or eglandular or puberulent; anthers glabrous to sparsely pubescent, mucronate basally; ovary densely pubescent, hair stiff and white; capsule up to 8 mm. long, exceeding the calyx, pubescent as the ovary, ellipsoid, obtuse.

Arequipa: Nevado de Chachani, alt. 3,900–4,000 m., *Pennell 13287*; alt. 4,000 m., *Rauh-Hirsch P 616*; *617*; Pichu Pichu, alt. 13,500 ft., *Stafford 810*.—Cuzco: Cerro de Colquipata, alt. 4,000–4,200 m., *Pennell 13734*; Aricoma Pass above Crucero, alt. 16,000 ft., *Stafford 1099*.—Dept. and Prov. Huancavelica: in puna grass, alt. 3,900 m., *Stork & Horton 10848*.—Junin: Cobracancha Valley, alt. 4,200 m., *Grant 7540*; near Morococha, alt. 4,350–4,800 m., *Grant 7559*; Yauli, alt. 13,500 ft., *Macbride & Featherstone 912*; *924*; Huancayo: In puna grass, alt. 4,500 m., *Stork 10938*; alt. 4,400 m., *Stork 10941*.—Lima: Cerro Colorado, E. of Canta, paramo slope, alt. 4,000–4,100 m., *Pennell 14675*; alt. 4,500 m., *Rauh-Hirsch P 258*.—Pasco: Cerro de Pasco, *Mathews s.n.*—Puno: Santa Lucia, alt. 14,000 ft., *Sharpe 150*; Capachica Peninsular, alt. 12,700 ft., *Tutin 1018*.—Sin. Depto: Huaron, alt. 14,000 ft., *Macbride & Featherstone 1117*.—Sin. Loc.: *Weberbauer 6480*; *Weddell s.n.*

Bartsia duripilis Edwin, Phytologia 19: 364. 1970.

Subshrub, erect and branched, wood and foliage hispid, the pubescence thickened at base, stem 4-angled and striate-sulcate. Leaves amplexicaul and cordate-subhastate, widest at the base, mostly shorter than the internodes, oblong, the largest about 4.0 cm. long and 1.5 cm. wide, frequently 3.0 cm. long and 1.0 cm. wide, very coarsely crenate, obtuse; flowers axillary, pedicellate, in upper leaf-axils; bracts longer than the flowers, subovate; pedicels up to 5 mm. long, densely pubescent; calyx obliquely campanulate, 8–9 mm. long, tube much longer than the broadly ovate, obtuse, 1-veined lobes, pubescent; corolla up to 12 mm. long, dark rose colored with the lower lip greenish bordered, tube longer than the lips, included in the calyx, galea dorsally tomentulose, obtuse, at least 2 times longer than the lower lip, barely emarginate, lip at least partly included in the calyx, lobes ovate, subequal; filaments with sessile glands on upper part, anthers pubescent with long, matted hair, acuminate at base; style puberulent, stigma lobes united, ovary densely beset with long, golden, stiff hair; fruit unknown.

Ayacucho: Prov. Huanta: Putis, Choimacota Valley, in evergreen shrub woods, alt. 3,200–3,300 m., *Weberbauer 7533*.

A clearly distinct taxon differing from all other *Bartsias* by the following combination of characters: stiffly hispid pubescence, large leaves, included corolla tube and partly included lower lip, oblique calyx with short, broad, obtuse lobes, longish pedicels, flowers borne in axils of leaves, not forming a definite spike or raceme and of small size. The lack of a definite inflorescence is rare in *Bartsia*.

Bartsia elachophylla Diels., Bot. Jahrb. 37: 431. 1906.

Perennial herb or subshrub, branches ascending, stem hispidulous above, about 50 cm. long. Leaves minute, sessile, suboblong-crenate, bullate, 4–6 mm. long and 1 mm. wide, pubescent; spike few-flowered, short, lax; flowers subsessile or short-pedicellate; calyx tube 4 mm. long, teeth broadly triangular or triangular, short, 1.5 mm. long; corolla tube about 4 mm. long, galea 5 mm. long, externally villulose, light purple, lip erect, 3.5 mm. long, dark yellow or purple; anthers pilose. (After original description, a few details added.)

Huanuco: Pillao, dry slope, alt. 2,700 m., *Woytkowski 34029.*— Junin: *Weberbauer 2087,* the type, not seen.

Bartsia elongata Wedd., Chl. And. Nov. 2: 127. 1860. *B. elongata* subvar. *pusilla* Wedd., l.c.

Erect, annual, branched, glandular-pubescent herb. Upper leaves linear-oblong and lanceolate, 5–15 mm. long, lower often wider and amplexicaul, bullate-crenate, apex elongate; flowers short-pedicellate or sessile, longer than the bracts; calyx oblong-campanulate, 5–6 mm. long, glandular-hispid, calyx-teeth linear or linear-oblong, entire, obtuse, a little longer than the tube; corolla up to 8 mm. long, the tube as long as the calyx, galea hispidulous or glabrous, subequaling the lip in length; anthers pubescent, with a very short barb or mucron at the base, capsule oblong, apiculate (after the original description).

Only a fragment of *Weddell 3665* from the high elevations near Carabaya seen. Collected (acc. Wedd.) also from the mountains around Cuzco.

This species is close to *B. hispida* Benth and *B. subinclusa* Benth differing from the former in having a much shorter, almost glabrous corolla with tube included in the calyx and from the latter in having a smaller calyx, non-tomentose corolla and more hispid stem. Study of further collections when available may prove these taxa to be conspecific.

Bartsia filiformis Wedd., Chl. And. Nov. 2: 126. 1860.

Perennial herb, stems elongate, thin, erect, subsimple, 4-angled, puberulent. Leaves linear-oblong and linear, 8–12 mm. long, obtuse, bullate-crenate, not or a little dilated at base, puberulent and glabrate; spike elongate, lax; flowers short-pedicellate or subsessile; calyx 5–6 mm. long, oblong-campanulate, sparsely glandular-hirtus or almost glabrous, lobes triangular, obtuse, crenate, a little shorter than the tube; corolla 6 mm. long, tube included, galea ovate, obtuse, pubescent, about 2 times as long as the lip; anthers sparsely pilose; capsule oblong, subemarginate, apiculate; corolla yellow-green. (After original description and comments.)

Sin. Dept.: Near Ayapata. Lechler exsicc. n. 1818 (Type K).

Bartsia glabra Edwin, Phytologia 19: 365. 1970.

Herb, stem simple, sparsely puberulent, rarely pubescent with the short-pubescence subappressed or appressed, foliage and fruit glabrous or the capsules occasionally with scant, white pubescence apically. Leaves linear or aciculiform to narrowly oblong-linear, up to 11 mm. long and 1–2 mm. wide, often 6–8 mm. long, margin bullate-crenate and revolute, obtuse and hammate at apex, slightly broadened and clasping at the sessile base, the costa elevated beneath; spikes dense above, interrupted below; bracts shorter than the flowers, similar to the stem leaves, except margins crenate on upper part only and a little wider in relation to the length; pedicels 1–2 mm. long; flowers up to 12 mm. long, usually 8–10 mm.; calyx 4–6 mm. long, tube longer than the lobes, pubescent on the veins, lobes narrowly ovate, acute, pubescent on the veins, margins ciliate; corolla whitish (in life), tube exserted, longer than the lips, galea pubescent, a little longer than the lower lip; filaments apically sparsely glandular and sparsely, very short-puberulent just below the summit, anthers glabrous to sparsely long-pubescent, acuminate; style puberulent above, stigma lobes united, ovary glabrous or apically with scant, stiff, white pubescence; capsule ellipsoid-ovoid, shorter than the calyx.

Amazonas: Cerro de Fraijaco (Huaui-Huni), N.E. of Tambo de Ventilla, dry jalca, alt. 3,500 m., *Pennell 15878*.

This species differs from all other Bartsias by the following combination of characters: corolla whitish, foliage, fruit, and ovary glabrous or almost so, eglandular galea and appressed puberulence on most of the stems.

Bartsia hispida Benth. in DC., Prodr. 10: 547. 1846.

Perennial, erect, paniculately branched herb, the stems hirsute with erect trichomes. Leaves lanceolate to linear-lanceolate, up to about 12 mm. long, scabrous-hirtus crenate-reflexed, upper caudate-amplexicaul at base; spikes numerous, lax; bracts reaching to about the calyx, crenate, hispid; flowers subsessile; calyx about 6 mm. long, glandular-pilose, teeth narrow, shorter than the tube; corolla about 12 mm. long, tube exserted; galea pubescent; equaling to little longer than the lip; anthers very sparsely pilose. (After original description.)

Chachapoyas: *Mathews 778* (K).—Junin: Tarma, 1–3 km. E. of Palca, near Carretera Central, alt. ca. 2,000 m., *Edwin 3924*.

Bartsia inaequalis Benth. in DC., Prodr. 10: 547. 1846. *B. camporum* and *B. thiantha* Diels., Bot. Jahrb. 37: 432–433. 1906.

Perennial herb or subshrub, much branched, variously pubescent or glandular-pubescent, frequently hispid, stems and branches usually 4-angled, especially above. Leaves variable in size and shape, narrowly lanceolate to lance-oblong, rarely almost linear, occasionally lance-ovate, up to 3 cm. long or little longer, often the main leaves exceeding 2 cm. long, frequently clustered beneath, apex acute to more often subobtuse, margin crenate-bullate, sessile, upper leaves cordate-amplexicaul; inflorescences racemose or spike-like, long or short, few-(6–8) to many-flowered (up to 30 or more), dense to lax, pedicels up to 5–6 mm. long, especially the lower; bracts shorter than the flower, lower similar to the cauline leaves, varying to almost or rarely quite entire above; calyces 6–11 mm. long, subcampanulate to subfunnelform, teeth narrowly triangular to lanceolate, acute, usually shorter than the tube; corolla dark red to purple, large for the genus, up to 2.7 cm. long, frequently exceeding 2.0 cm., tube subconical, longer than the lips, throat a little inflated, galea about 2 times longer than the lip, densely pubescent or glandular-pubescent externally, notched at apex, lobes of the lip ovate, obtuse, sometimes the median apically notched, filaments sparsely, microscopically puberulent on upper half, stigma lobes united, ovary densely matted with golden hair; capsule ovoid, little shorter or longer than the calyx, the tube of which is greatly inflated, obtuse apically pubescent as the ovary, the style persisting or early deciduous.

Apurimac: Cord. Salcantay alt. 3,500 m., *Rauh-Hirsch P 1454*. —Arequipa: Pichu Pichu, alt. 11,500 ft., *Stafford 811*.—Cuzco: Prov. Urubamba, Macchu Picchu, alt. 2,000–3,000 m., *Herrera 2000*; *Rauh-Hirsch P 785*; *Saunders 426*; *Stafford 795*; San Gabon, Chichacori

Valley, 10,500 ft., *Fisher 18*; Allantaitambo, alt. 2,800 m., *Herrera 3411*; Yanamancha, alt. 3,799 m., *Marin 1783*; Sacsahuamán, alt. 3,500–3,600 m., *Pennell 13551*; below Colquipata, alt. 3,200–3,300 m., *Pennell 13775*; suburbs of Cuzco, *Soukup 571*; Paucartambo, alt. 3,000–3,100 m., *Vargas 314*; Colinas del Rodadero, *Vargas 3131*. —Huancavelica: Prov. Tayacaja, Pampas–Salcabamba Trail, alt. 2,500 m., *Stork & Horton 10438*.—Huanuco: several km. SE. of Carpish, alt. 2,800 m., *Stork & Horton 9904*.—Lima: Prov. Huarochin, km. 85, Carretera Central, high mountain above Matucana, alt. 10,500–11,000 ft., *Saunders 289*.—Sin. loc.: *Diehl, 2556*.

This common species of southern Peru has the largest flowers found in the genus in the country. These are uniformly dark red to purple.

Also collected in Bolivia and Ecuador where the leaves are larger, wider in relation to their length, and more coarsely crenate.

Bartsia integrifolia Wedd., Chl. And. Nov. 2: 131. 1860.

Minutely puberulent, thin stemmed, usually branching subshrub. Leaves narrowly linear, 5–15 mm. long, margin entire, revolute, apex acute, base not or little dilated; flowers short-pedicellate; calyx oblong-campanulate, 5–9 mm. long, puberulent or very finely tomentose, calyx lobes linear-triangular, entire, acute, little shorter to equaling the tube; corolla 10–15 mm. long, tube exserted, galea ovate, obtuse, glabrous, little shorter than the tube; anthers densely pilose, mucronulate at base; capsule oblong, obtuse, apiculate. (After the original description.)

Only a fragment of *Castelenau,s.n.* (the type) from Depto. Lima seen. The only other collection cited is *Cay, s.n.* from Cuzco.

Entire-leaved species of *Bartsia* are not common.

Bartsia meyeniana Benth. in DC., Prodr. 10: 546. 1846.

Erect or ascending soft-pubescent and glandular-pubescent perennial herb. Leaves oblong-lanceolate, up to about 1.6 cm. long, usually shorter, obtuse, sessile and sometimes clasping, broadest at the base, crenate, crenations bullate; spikes short, interrupted below, subdensely few-flowered; bracts smaller than but similar to the leaves, elliptic or oblong; flowers subsessile; calyx 7–9 mm. long, the narrowly triangular, obtuse teeth almost as long as the tube; corolla red, 16–19 mm. long, tube longer than the lips, galea sparsely to densely pubescent, much shorter than the spreading, reflexed lip (ca. one-half the length of the lip); filaments short for the genus, inserted

at the apex of the tube, dotted with a few, sessile, red glands on the upper part; anthers pubescent with long, white hair, with a short, sharp acumin at base; style pubescent on the upper half, stigma lobes united, ovary densely beset with long, golden hair; capsule ex desc., oblong, acute, pubescent.

Junin (Pisco): Castroverreina, Pisco Valley, alt. 3,600 m., *Rauh-Hirsch P 372.*—Also reported, Sin. Dept.: near Tacora, *Meyen s.n.* Found at high elevations in Bolivia.

Although the Peruvian specimen is erect and 40 cm. tall, the taxon elsewhere contains dwarfs with ascending branches.

Bartsia mutica Benth. in DC., Prodr. 10: 548. 1846. *Euphrasia mutica* HBK., Nov. Gen. et Sp. 2: 334. 1817. *Bartsia chilensis* Benth. in DC., Prodr. 10: 547. 1846.

Based upon an unpublished name of Bertero, "Lamourouxia euphrasioides," not conspecific with *Bartsia euphrasioides* Wedd. of Ecuador.

Annual or perennial, erect, much branched, glandular, hispid herb. Leaves hispid, oblong to linear-lanceolate, obtuse, up to 2 cm. long or longer, grossly crenate, plane or a little revolute, cordate-amplexicaul at base; floral leaves smaller, otherwise as the cauline; spikes lax; pedicels mostly 2–3 mm. long; calyx 7–9 mm. long, pubescent, lobes linear, subacute to subobtuse, often unequal, about as long as the tube, entire to less often sparsely denticulate or serrulate; corolla purple, 10–16 mm. long, the tube longer than the lips, exserted, galea pubescent or more often glandular-pubescent, longer to shorter than the lip with lobes elliptical to narrowly ovate; filaments glabrous, the pairs subequal in length, anthers glabrous, blunt to acute at base, neither mucronate nor acuminate; ovary densely pubescent, style elongate, stigma unequally bifid; capsule longer or shorter than the calyx, pubescent.

Lima: Along Río Chillon, near Obrajillo, alt. 2,200–2,500 m., *Pennell 14326.*—Sin. Dept.: Between Lucarque and Ayavaca, Bonpland 3466. (Fragment seen.)

This taxon is not uncommon in Chile. The description has been based largely on specimens collected there. Both Benthan and Weddell found difficulty in distinguishing *B. mutica* from *B. chilensis*. It seems the better course to unite the specimens under one appellation at least until further Peruvian specimens become available.

Bartsia orthocarpiflora Benth. in DC., Prodr. 10: 545. 1846.

Perennial herb, occasionally annual, variously pubescent, stems erect, branched, long- and short-pubescent. Leaves hirtellus, sessile, bullate-crenate, linear-oblong to narrowly lance-ovate, widest at the base, obtuse apically; spike usually short, basally interrupted; pedicels 1–2 mm. long, calyx oblong-campanulate, 5–6 mm. long, tube much longer than the 1.5 mm., frequently obtuse teeth; corolla red to green-yellow, up to 16 mm. long, mostly 9–14 mm., most often narrow, tube much exserted, densely puberulent and often glandular, longer or shorter than the galea, galea about 3 times as long as the lip, apically barely emarginate; lobes of the lip about 1 mm. long; filaments glabrous or under 30 ×, apically, sparsely glandular or puberulent, anthers densely long-pubescent, basally mucronate; style puberulent, stigma lobes wholly united, punctiform to subulate; ovary densely beset with long, stiff, golden hair; capsule ellipsoid-ovoid, apically long and stiff pubescent, longer than the calyx.

Apurimac: Río Pinco, alt. 3,500–3,600 m., *Weberbauer 5904.*—Cuzco: Cerro de Cusilluyoc, open grassy slope, alt. 3,400–3,500 m., *Pennell 13808.*—Huanuco: Pillao, 2,700 m. alt., *Woytkowski 50.*—Junin: Prov. Huancayo: between Huancayo and Acopalca, alt. 3,700 m., *Stork 10924.*—Sin. Loc.: *Pavon s.n.*

A basically Bolivian species but reaching to South-Central Peru. The galea that is about three times longer than the lip helps to delimit this taxon.

Bartsia parvifolia Benth. in DC., Prodr. 10: 545. 1846.

Perennial herb, stems minutely puberulent, branched, the branching opposite, at least the lower and middle nodes longer than the leaves on the main stem and branches. Blades linear-oblong to narrowly oblong-subovate, reaching 2.0 cm. long, mostly less than 1.0 cm. long and (a few) up to 5 mm. wide, frequently narrower, hispidulous, sessile and often clasping, bullate-crenate, obtuse, base narrowed or a little wider; spike lax; flowers sessile or subsessile; calyx oblique, ovate-campanulate, pubescent, especially on the main veins, tube 4.5–5.0 mm. long, lobes 1.5–2.0 mm., broadly triangular; corolla about 10 mm. long, tube a little exserted; galea red, tomentose, little longer than the yellow or green lower lip; anthers pilose, mucronate at base; stigma lobes united, punctiform; capsule oblong, about as long as the calyx.

Huancayo: Huaytapallana, alt. 4,900 m., *Rauh–Hirsch P 1737.* —Junin: Prov. Tarma: Between Palca and Carpapata, alt. 2,900 m., *Stork 10980.*

This taxon described from Venezuela differs from *Bartsia bartsioides* (Hook) Edwin in the shape of the calyx lobes and their size in relation to the tube, the size of the flower, and the lax inflorescence.

Bartsia pedicellata Edwin, Phytologia 19: 366. 1970.

Erect annual, simple or with a few, short rosulate branches, stems pubescent-puberulent with flattened, somewhat curly, multicellular hair. Leaves glabrous or sparsely pubescent on the margins and main veins with multicellular hair, linear or narrowly oblanceolate, up to about 1.0 cm. long and 0.2 cm. wide, crenate-revolute, apex obtuse, hammate, base sessile subclasping; floriferous over most of the length of the stems in lax racemes; bracts wider than the cauline leaves; pedicels 7 (–8) mm. long, erect, almost parallel to the stems; flowers 8–11 mm. long; calyx oblique, tube longer than the crenate, obtusely-rounded lobes; corolla purple, tube longer than the lips, galea tomentose with multicellular hair, about twice as long as the lip, lobes of the lip elliptic-oblong; filaments sparsely glandular above with sessile glands, anthers tomentose, acuminate at base; style glabrous, stigmas united, ovary glabrous; capsule glabrous, oblong, almost twice the length of the calyx, mucronulate at the obtuse apex.

Cuzco: Paucartambo to Tres Cruces, Cerro de Cusilluyoc, moist gravelly banks and swales, alt. 3,500–3,800 m., corolla "dull magenta purple." Annual herb. *Pennell 13815.*

This taxon differs from all other Bartsias by the combination of multicellular, flattened pubescence on the stems and branches, erect, strict, 7–8 mm. long pedicels, crenate calyx lobe, and glabrous capsule twice the length of the calyx.

Bartsia pedicularioides Benth.. in DC., Prodr. 10: 546. 1846.

Perennial, root shoots short, thin ascending, leaves minute to about 8–10 mm. long, short-petiolate. Stems erect, much branched, viscose, pilose; leaves oblong, subsessile, larger than root shoots, bullate-crenate, obtuse; spike glandular-pilose, interrupted at base; flowers violet, at least the lower pedicellate; calyx 5–6 mm. long, ovate-oblong, lobes triangular-ovate, shorter than the tube; the corolla 8–9 mm. long, little exceeding the calyx, lips subequal, galea hirsute or almost lanate, oblong, obtuse, lobes of the lip short, obtuse; anthers glabrous; capsule ovate, 8–11 mm. long, hirsute at apex. (After original description and Weddell l.c. 121–122.)

Cuzco: Mountains of Cuzco. *Gay s.n.* (Material not seen.) Also reported from Venezuela and Ecuador.

Weddell includes *Bartsia parvifolia* Benth. in the synonymy of this taxon. It is retained as a species in this paper.

Bartsia peruviana Walp., Nov. Acta. Acad. Caes. Leopold. Carol. Nat. Cur. 19: suppl. 1, 400. 1843; Rep. 3: 408. 1844; Benth. in DC., Prodr. 10: 357. 1846; Wedd. Chl. And. Nov. 2: 128. 1860.

Herb with opposite branching, erect, glandular-tomentose stems, blackening in drying; leaves linear, 13–20 mm. long and 3–6 mm. wide, crenate-dentate, obtuse, glandular-tomentose, sessile; inflorescences spicate or flowers axillary, subsessile, solitary; calyx 18–20 mm. long, campanulate, equally 4-toothed, teeth linear, obtuse; corolla brown, little longer than the calyx; seeds very small, subsmooth. (Description after Walpers, 1844.)

Arequipa: Chuquibamba Prov.: Condesuyos, under rocks, open hillside, alt. 10,500 ft., *Stafford 1214*.—Puno: Laguna de Titicaca & Tisslaoma, *Meyen 3900* (material not seen).

Type (K) from Bolivia (Sorata).

Bartsia sanguinea Diels., Bot. Jahrb. 37: 433. 1906.

Caespitose dwarf, stems 5–8 cm. tall, sparsely pilose or glabrate, blackening on drying. Leaves thickened, almost glabrous, obovate, conspicuously bullate-crenate above, almost entire below; spike few-flowered; calyx subinflated, subhyaline, pilose, 7 mm. long and 4.5 wide, teeth triangular; corolla blood-red, tube about 6–8 mm. long; galea densely short-tomentose, 6–7 mm. long, lip 5 mm. long; anthers pilose; capsule glabrous at the apex. (After original description.)

Sin Dept.: Roadside between Cuzco and St. Anna, alt. 4,000 m., *Weberbauer 4945*. (Not seen.) The type seen, from Bolivia (Sorata), *Rusby 1092* (K).

Bartsia santolinaefolia Benth. in DC., Prodr. 10: 546. 1846. *Euphrasia santolinaefolia* HBK., Nov. Gen. et Sp. 2: 333, *pl. 166*. 1818.

Perennial herb to subshrub, from almost unbranched to profusely branching from the base, erect, elongate, frequently rigid, usually glandular-pilose, often (in life) viscose. Leaves oblong-linear to lanceolate or lance-ovate, up to almost 3 cm. long and 4–5 mm. wide, usually considerably smaller; margins coarsely crenate-bullate, apex

obtuse, the sessile base usually not narrowed, often clasping; spikes dense to lax and often interrupted basally; bracts ovate or obovate, closely to subdistantly, coarsely crenate, subsessile, about as long as or little longer than the calyx, uppermost often only with 1–2 pairs of teeth; calyx tubular-campanulate, 6–8 mm. long, lobes oblong, obtuse, entire and longer than the tube, rarely crenate-crenulate and shorter than the tube; corolla yellow to purple, 9–13(–15) mm. long, tube exserted, longer than the lips, galea little longer than the lip, puberulent or glandular-pubescent, glands on long hair; anthers glabrous or pubescent, mucronulate at base, filaments puberulent; ovary densely long, stiff, golden pubescent; capsule pubescent on upper half as the ovary, ellipsoid, not filling the inflated calyx and about equal in length, emarginate and frequently apiculate.

Amazonas: Daguas on Rio Sonche, E. of Chachapoyas, alt. 2,400 m., *Pennell 15745*; *Mathews s.n.*—Ancash: Cordillera Blanca, alt. 3,900 m., *Rauh-Hirsch P 2057*. Cajamarca: S.W. of Cajamarca, alt. 2,800–2,900 m., *Pennell & Reichlin 14969*.—Cuzco: near Rio Paucartambo, below Paucartambo, alt. 2,900–3,200 m., *Pennell 13796*.—Huanuco: slope of Hill, western slope of Torre-huase, alt. 3,300 m., *Woytkowski 329*.

This taxon forms a close alliance with *B. diffusa* Benth. and *B. hispida* Benth.

Bartsia simulans Edwin, Phytologia 19: 367. 1970.

Perennial shrublet up to about 20 cm. tall, branching from the base. Stems terete, drying light to dark brown, the soft, glandular-pubescence mixed with soft and also scattered, stiff, eglandular hairs; leaf-blades thickened, sessile, pubescent above, beneath and on the margins as the stem, except more stiff hairs present, obovate or spathulate-obovate or oblong-obovate in outline, up to about 1.0 cm. long and half as wide, margins with 3–5 pairs of rounded, close or distant lobes, these increasing in size base to apex, the apical lobe largest, narrowed to base, venation obscure above, apparent beneath; flowers in short, apical, dense, spikes; bracts similar to the leaves, except a little smaller and the 2–3 pairs of lobes usually more or less distant, shorter than the flowers; calyx glandular, 9–11 mm. long, tube 4–5 mm. long, little shorter than the 5–6 mm. long, lance-oblong or oblong, subacute lobes; corolla 10–13 mm. long, yellow and red, almost wholly included in the calyx to little exserted, the corolla tube entirely included, narrow, longer than the lips, galea 3.0–4.5 mm. long, dorsally densely glandular, apically notched, little

shorter than the lip the lobes of which are very broadly ovate to suborbicular, the median little larger than the lateral; stamens didynamous, the pairs very unequal in length, anthers glabrous, basally mucronulate, filaments sparsely puberulent (under 20×); style exceeding the stamens, stigma exserted punctiform, ovary densely golden pubescent, the hairs stiffish; capsule elliptical or elliptically obovoid, little shorter than the calyx, pubescent at least apically with long, stiffish, golden hairs and apiculate style tardily deciduous or persistent, placenta thin; seed numerous, ovoid, narrowed to both ends, testa striate-striatulate, closely adherent.

Puno: San Antonio de Esquilache in clefts in face of rock at alt. 15,500 ft., May 16, 1937. *Stafford 743.*

Most closely resembling *Bartsia diffusa* Benth. which has ovate bracts with lobes decreasing in size base to apex, exserted corollas, wider calyx lobes that are usually not longer than the calyx tube, and different pubescence.

Bartsia subinclusa Benth. in DC., Prodr. 10: 547. 1846.

Hispidulous-scabrous plant, stems glandular-hirtus above, soft-pubescent below. Leaves sessile below, cordate-clasping above, pubescent with stiffish, white hair, especially on the margins and main veins, linear-lanceolate, up to about 1.8 cm. long and 3–5 mm. wide, crenate, crenations recurved, obtuse, spike few-flowered; calyx about 10 mm. long, teeth linear, obtuse, shorter than the narrow tube, exceeding the corolla tube and throat; corolla tomentose, only the apices of the lips exserted; galea about equal to the lip, tube equal to or shorter than the galea; anthers sparsely long-pubescent, basal acumin short. (After original description.)

Sin. Dept.: Near Tissacoma, alt. 15,000 ft., *Meyen s.n.* (Type K.)

Bartsia trichophylla Wedd., Chl. And. Nov. 2: 122. 1860.

Small perennial (subshrub?) with the stems profusely branching from the base, primary branches ascending, to 10 cm. tall, apically hispid-pilose. Leaves densely crowded, especially below, lower 4–5 mm. long and 1.0–1.5 mm. wide, size increasing to the middle of the plant to about one-half bigger, oblong or spathulate-lanceolate, obtuse, bullate-crenulate, attenuate to a short petiole, glabrous except for the margin (that is) ciliate with articulated 1 mm. long hair; flowers about 6–8, in sometimes lax racemes; pedicels almost as long as the 5 mm. calyx but shorter than the bracts; calyx oblong-campanulate, sparsely pilose, lobes oblong, obtuse, crenate, shorter than

the tube; corolla tube glabrous, 8–9 mm. long, little exserted, galea densely tomentose, oblong, obtuse, about 2 times longer than the lip; lobes of the lower lip about 1 mm. long, rounded, glabrous; filaments sparsely, retrorsely barbed on one side, anthers sparsely barbed; ovary glabrous. (From original description and comments.)

Sin. Dept.: South Peru. Rocky hills between Puno and Arequipa, alt. 4,000 m., *Weddell s.n.*

Bartsia viridis Edwin, Phytologia 19: 367. 1970.

Annual, erect herb, old stems glabrate, younger with definite lines of soft pubescence, all stems 4-angled, sulcate, drying very dark red to black. Leaves linear or aciculiform, usually minute to 6 mm. long, occasionally reaching 2.0 cm., bullate-crenate and revolute, apex obtuse, hammate, often a little widened to the clasping base, sessile, glabrous or sparsely pubescent, main vein elevated beneath, other venation not visible; bracts crenate, at least the upper ellipsoid-ovate, about as long as or barely exceeding the calyces; flowers mostly aggregated into short, lax, interrupted spikes, sessile or subsessile on pedicels reaching 2 mm. long, usually not exceeding 1.5 mm., and very small for the genus, 8–10 mm. long, occasionally up to 11 mm. long; calyx narrow, usually glandular-puberulent, 4.0–5.5 mm. long, tube longer than the lance-triangular, acute lobes; corolla green, tube longer than the lips, galea 2 times as long as the lower lip, usually 1.5 times longer, eglandular, pubescent, lobes of the lip unequal, the median longer than the lateral, all ovate, rounded; filaments sparsely dotted with small, sessile glands, anthers pubescent, mucronate at base; style puberulent above, stigma lobes united, ovary beset with long, stiff, golden hair; capsule ovoid to broadly ovoid, obtuse to rounded at apex, with long, stiff, golden hair apically, a little shorter than the calyx and enveloped by it.

Cuzco: Paso de Trés Cruces, Cerro de Cusilluyac, mossy banks and knolls on paramo, alt. 3,700–3,900 m., *Pennell 13826.*

The combination of very small, green flowers with included corolla tube and partly included lower lip as well as the arrangement of the pubescence on the stems and branches separates this taxon from all other Bartsias.

According to the collector the corolla is "mignonette green."

Bartsia weberbaueri Diels., Bot. Jahrb. 37: 431. 1906.

Vine, the stem twining among shrubs, up to 2 m. long, hispidulous above. Leaves patent, sessile, cordate at base, oblong or lanceolate-

oblong, stem leaves 15–20 mm. long and about 4–5 mm. wide, crenate, leaves of the lateral branches smaller; flowers on slender pedicels, 5–10 mm. long; calyx glandular-hispid, tube 10 mm. long and 6–7 mm. wide, teeth triangular, about 7 mm. long; corolla tube 10 mm. long, galea wide, externally villose, 10 mm. long, dark purple, lip erect, 6–7 mm. long, bright green; anthers pilose, exserted. (After original description.)

Ancash: Cajatambo Prov., near Ocros, in shrub snag, alt. 3,500–3,700 m., *Weberbauer 2692*. (Material not seen.)

BASISTEMON Turcz.

Basistemon Turcz., Bull. Soc. Imp. Nat. Mosc. 36(2): 214. 1863. *Hassleropsis* Chod., Bull. Herb. Boiss. ser. 2, 4: 285. 1904. *Saccanthus* Herzog., Meded. Rijks Herb. Leid. 29: 47. 1916.

Reference: Baehni and Macbride, Candollea 5: 345. 1934. and 7: 185–188. 1936. Junell, Symbol. Bot. Upsal. 4: 1934. Moldenke, Bull. Torr. Bot. Club 63(6): 345. 1936.[1]

Shrubs or small trees, usually subglabrous or new wood sparsely, minutely puberulent; leaves opposite, subsessile to sessile, ovate or broadly ovate, long-acute to acuminate, acumin sharp, 4–15 cm. long and 1.8–8.0 cm. wide, base subacute to obtuse, margin entire, or minutely serrulate, glabrous, punctate or puncticulate on both surfaces; petioles when present only up to 2–3 mm. long, swollen at base, margins sparsely puberulent; flowers axillary, 2–5 fasciculate, pedicellate; pedicels 3–10 mm. long, glabrous, or sparsely, minutely puberulent, bracteolate at base; calyx about 3 mm. long, ovate; corolla bilabiate, 5–8 mm. long, tube short to long, saccate at base, lips subequal, lobes 5, all about equal or the 2 anterior little shorter; stamens 4, didynamous, the pairs little to very unequal, all inserted at or near the base of the tube, anther connective much enlarged at maturity, the thecae at length divergent and dehiscing by longitudinal slits; ovary shorter than the erect style, stigma lobes united; capsule ex desc. loculicidal; seeds few to numerous, axile and pendulous, albumen lacking. Two species collected in Peru.

A genus of six species at present wholly restricted to South America in Peru, Colombia, Argentina, and Paraguay, from 30–1,500 m.

[1] The details of the checkered taxonomic and nomenclatural history of this genus are beyond the scope of this flora. Although only six species are known at present, the genus has been placed in the *Verbenaceae* and the *Bignoniaceae* as well as in the *Scrophulariaceae*, where it provisionally appears here.

alt. Very few collections known, perhaps not more than 40. The specific variation displayed by and the altitudinal spread of the few collections would seem to imply a large genus (in species number) yet poorly collected.[1]

Leaves 10–15 cm. long and 5–6(–8) cm. wide; petioles 2–3 mm. long. *B. peruvianus.*

Leaves 3.5–6.0 cm. long and 1.5–3.3 cm. wide; petioles lacking or up to 0.8 mm. long..... *B. intermedius.*

Basistemon intermedius Edwin, Phytologia 19: 368. 1970.

Unarmed shrub with glabrous leaves, otherwise mostly minutely puberulent. Leaves ovate, acuminate, 3.5–6.0 cm. long and 1.5–3.3 cm. wide, bases obtuse, margins minutely serrulate, punticulate on both surfaces; petioles up to 0.8 mm. long or lacking, minutely puberulent, gibbose at base and at least partly surrounding the stem; flowers 2–3-fasciculate, in axils of unmodified leaves, pedicellate; pedicels 3–5 mm. long, puberulent, with a pair of minute, hard, puberulent bracteoles at the bases; calyx with 5 ovate, puberulent sepals, 3.0–3.5 mm. long, apices long-acuminate, margins ciliolate, united about one-third their length into a campanulate tube; corolla weakly saccate at base, white, 7–8 mm. long, bilabiate, lips subequal, the 2 anterior lobes little shorter than the 3 posterior, tube about 6 mm. long; stamens 4, didynamous, anterior pair about 2 mm. long, posterior 3 mm. long, anthers subovoid, divergent, dehiscing by longitudinal slits, connective enlarged, hardened at maturity, filaments gibbose at base, inserted about 1 mm. above the base of the corolla tube; ovary narrowly ellipsoid-ovoid, much shorter than the style, stigma lobes united punctiform; fruit unknown.

Huanuco: Ganso Azul, Agua Caliente on Río Pachitea, alt. 1,000 ft., dense shade; Oct. 17, 1942, *Sandeman 3380.* (Type K; Isotype OXF.)

Near *B. peruvianus* Benth. & Hook. f. apud Hook f. & Jacks. but differing in the length of corolla lobes in relation to the tube, distribution and amount of vesture and size of the leaves. The taxon appears to stand between *B. peruvianus* and *B. rusbyi* Moldenke.

Basistemon peruvianus Benth. & Hook. f. apud Hook f. & Jacks. Ind. Kew. 1: 277. 1895.[2]

[1] An opinion of Pennell in correspondence to Moldenke.

[2] *Basistemon* in Benth. & Hook. f., Gen. Pl. 2: 1,224–1,245. 1876, barely referred (without specific diagnosis) to the species.

Bracteoles and sepals ciliolate, petioles minutely puberulent, otherwise a glabrous shrub or small tree. Pedicels 5–7(–8) mm. long, bracteoles minute; calyx lobes 2.5–3.5 mm. long, narrowly ovate, connate about one-third their length into a flaring tube; corolla (ex coll.) lilac, white and cream, tube ca. 1.5 mm. long, lobes ca. 4.5 mm. long; stamens included or little exserted, filaments 1.5–2.5 mm. long, flattened or terete, anthers separated on a bulbous connective, divergent; ovary narrowly ellipsoid. Fruit not seen.

San Martin: Juan Jui, Alto Río Huallaga at 400 m. alt., forest, *Klug 3780* (K); near Tarapoto, *Spruce 4515*, the type (K). The Klug specimen is in close agreement with the type seen at Kew.

BUCHNERA L.

Annual or perennial, probably hemi-parasitic herbs, becoming black upon drying. Stem erect, simple or branched, glabrous to hispid-scabrid, hairs often callus based; leaves all opposite, sometimes subopposite above or all alternate, simple, usually sessile, occasionally short-petiolate, rarely forming small, basal rosettes, filiform to linear-lanceolate, less than 1 mm. to a few mm. wide, apex acute or obtuse, margin entire or with a few, scattered, small teeth, 1–5-nerved; inflorescence terminal, spicate, compact to lax; flowers subtended by one bract and two bracteoles; calyx tubular, 10-nerved, regularly to irregularly 5-dentate, glabrous to hispid-scabrid or verrucose; teeth erect, spreading or reflexed; corolla white, blue or violet, salverform, tube longer than the calyx, externally glabrous to softly pubescent, lobes subequal, ovate to subrotund, entire to emarginate, throat pilose; stamens 4, included, slightly didynamous; anthers monothecous; stigma linear-cylindric, style apex clavate, entire; capsule ovoid, oblate to cylindric, shorter to longer than the calyx, loculicidal, seeds numerous.[1]

A genus comprising about 100 species which are almost wholly tropical and chiefly Old World. Sixteen species are found in the New World. A single collection is known from Canada. Taxa are found more or less abundantly in the United States, Central America and the West Indies and South America, Chile excepted. Four species have been found in Peru.

1. Corolla externally glabrous; annual herbs.

[1] This generic description and the following species descriptions after Philcox, Kew. Bull. 18 (2): 275–315. 1965.

2. Calyx teeth lanceolate—or long—acuminate, more or less spreading; bracteoles linear or linear-lanceolate.
   3. Leaves alternate; calyx glabrous; stems glabrous or sparsely pubescent below with adpressed, upward directed hairs. *B. palustris.*
   3. Leaves opposite or subopposite; calyx tube hispid-scabrid on nerves; stems pubescent throughout with callus-based hairs. . . . . *B. pusilla.*
2. Calyx teeth triangular, erect; bracteoles narrowly ovate-lanceolate. . . . . *B. weberbaueri.*

1. Corolla externally soft-pubescent; perennial herbs. . . . . *B. rosea.*

Buchnera palustris (Aubl.) Spreng., Syst. 2: 805. 1825. *Piripea palustris* Aubl., Pl. Guian. 2: 628, *t. 253*. 1775.

Annual herb, up to 65 cm. tall, usually not exceeding 45 cm., subglabrous. Stem simple or branched, terete, glabrous above to sparsely pubescent below with upwardly directed hairs; cauline leaves alternate, narrowly linear, 1.0–3.5 cm. long and 0.5–1.5 mm. wide, entire, acute, 1-nerved, minutely scabrous-verrucose, finely hispid on the margin basally; lowest leaves (basal) minute, obovate, entire; inflorescence lax, up to 15 cm. long; bracts ovate-lanceolate, subacuminate, 3.0–5.5 mm. long, scabrous-verrucose, ciliate, carinate; bracteoles linear-lanceolate, setaceous-ciliate, little shorter than bracts; calyx 7–10 mm. long, not reticulate between main nerves, glabrous, teeth erect, lanceolate-acuminate, subciliate; corolla blue, pink to purple, tube slender, glabrous, incurved, up to twice as long as the calyx, lobes obovate, emarginate, subequal; capsule oblate-cylindric, obtuse, equaling to slightly longer than the calyx; style base deciduous.

San Martin: Tarapoto, *Spruce 4397 p.p.*

Riversides and marshy places from Colombia through Venezuela and the Guianas to Brazil and westward to eastern Peru.

Buchnera pusila HBK., Nov. Gen. et Sp. 2: 340. 1818. *B. tinctoria* Bertol., Fl. Guatim. 26. 1840; *B. pilosa* Benth., Bot. Voy. Sulph. 144. 1845. *B. lithospermifolia* sensu Benth. in DC., Prodr. 10: 497. 1846, non HBK. *B. major* Polak, Linnaea 41: 588. 1877. *B. elongata* sensu Hemsl., Biol. Centr. Am. 2: 457. 1881 et sensu Goyena, Fl. Nicar. 619. 1911, non Sw.

Annual herb, usually 15–30 cm. tall, rarely up to 70 cm. Stem slender, simple or branched, hispid with callus-based hair; leaves subopposite, upper linear, entire or subentire, up to 2 mm. wide, 1-nerved, densely hispid-scabrid, lower obovate-oblong to oblong, entire to deeply dentate, obtuse or acute, 1.5–5.0 mm. wide, hispid-scabrid, often similar to upper leaves; inflorescence up to 12 (–24) cm. long, lax to congested; bracts lanceolate, hispid-scabrid, up to 5.5 mm. long; bracteoles linear, shorter than bracts; calyx up to 8 mm. long, nervation between the hispid-scabrid main veins lacking, otherwise glabrous, teeth long-acuminate, spreading to reflexed in fruit; corolla usually white, occasionally pink to lilac or purple, tube slender, externally glabrous, little to twice as long as the calyx, lobes 4–10 mm. long, ovate to obovate, entire, throat pilose; capsule oblong, compressed, equal to the calyx.

Cuzco: Prov. Urubamba, petals pink, open grass slope, alt. 2,900 m., *Vargas 2702*.—Junin: Mito, northeastern grasslands, flowers pink, alt. about 9,000 ft., *Macbride & Featherstone 1408*.—Sin. Dept.: *Pavon s.n.* (coll. 1827, specimen at P).

The most variable of all the new world species of this genus.

More or less frequently encountered in low-lying meadows to medium altitude oak and pine woods, and rocky hillsides from Mexico through Central America to South America including Venezuela, Brazil, British Guiana, Colombia, Ecuador, and Peru.

This species and *B. longifolia* HBK. are very closely allied and perhaps even conspecific. The distribution of the latter taxon is essentially that of *B. pusila* in South America.

Buchnera rosea HBK., Nov. Gen et Sp. 2: 342. 1818. *B. rosea* var. *congesta* Schmidt. in Mart., Fl. Bras. 8: 328. 1862. *B. lithospermifolia* sensu Standl., in Contr. U. S. Nat. Herb. 27: 334. 1928, non HBK.

Perennial herb (30–)45–60(–115) cm. tall. Stem simple or branched, upright, glabrescent above to hispid-pilose below; leaves opposite to subopposite (the lowermost sometimes alternate), linear-lanceolate, 4.5–8.5 mm. wide, entire or serrulate, rigid, subcoriaceous, 3–5-nerved, nerves prominent beneath, glabrous to scabrous above, subglabrous to hispid-scabrous beneath, especially on the nerves and margins; inflorescence spicate, variable, elongate and lax (20 cm. long) to tightly compact and many-flowered (3.5 cm. long); bracts ovate-lanceolate, about 2.5–4.0 mm. long, hispid-scabrid, ciliate;

bracteoles linear-subulate, hispid; calyx erect, up to about 7.5 mm. long in fruit, densely reticulate between the main nerves, spreading hispid, pubescent with short, stiff hairs or glabrescent on the tube, teeth subequal, short-deltoid, densely to finely hispid-scabrid; corolla blue, violet to purple, tube slender, almost twice the length of the calyx, externally softly pubescent, lobes obovate, emarginate or entire; capsule ovoid, compressed, slightly longer than the mature calyx, style base partly persistent.

San Martin: low mountain pastures near Tarapoto, *Spruce 4862*; Sin. Loc.: *Jussieu, s.n.*

This species is found in low-lying savannas and riversides to medium altitude grassy hillsides from Panama and Colombia, east through Venezuela to British Guiana, south through Brazil to Bolivia and westward to Peru.

Buchnera weberbaueri Diels in Engler, Bot. Jahrb. 37: 430. 1906. *B. leiantha* Standl., in Field Mus. Publ. Bot. 22: 105. 1940.

Annual herb (15–) 25–50 (–78) cm. tall. Stem slender, simple or very rarely branched, glabrous to subglabrous above with scant, soft pubescence near and just above the nodes, sparsely pubescent at base; leaves opposite to subopposite, erect, linear, 0.5–2.0 mm. wide, entire, trinerved, a few adpressed hairs on revolute margins at base, upper leaves becoming ovate-lanceolate with hispid margins similar to bracts; inflorescence spicate, elongate, 1.0–3.5 (–7.0) cm. long, laxly flowered; bracts broadly ovate, acuminate, about 3.0 mm. long and 1.5 mm. wide at base, ciliate; bracteoles narrowly ovate-lanceolate, ciliate, little shorter than bracts; calyx about 5.0–7.0 mm. long, glabrous, finely reticulate between the nerves, teeth triangular-acuminate, subequal; corolla tube slender, up to about 5.0–8.5 mm. long, longer than the calyx, externally glabrous, lobes 2.5 mm. long, broadly ovate; capsule cylindric, slightly compressed and shorter than the calyx with a few hairs at the suture, style-base deciduous.

Cuzco: Prov. Urubamba, grass slope, petals blue, alt. 2,900 m., *Vargas 2702*.—Junin: Petals pink-lilac, appendages fringed, alt. about 9,000 ft., *Macbride & Featherstone 1408*; Congos, *Vidal-Senege 4825*.—Loreto: Moyobamba, Mt. Morro, alt. 900–1,100 m., *Weberbauer 4595* (photo of type).—San Martin: high mountain pastures near Tarapoto, *Spruce 4397 p.p.*

Lowlands to high mountain passes from British Honduras and Panama to Colombia and Peru and east to Venezuela and Trinidad.

Buchnera ternifolia HBK., collected north, east, and south of Peru could well be encountered in lowland areas (up to 1,600 m.) within its borders.

CALCEOLARIA L.

Calceolaria L., Kongl. Vetensk. Akad. Handl. 31:288. 1770, non (Heister) Fabricius, Enum. Meth. Pl. Hort. Helmstad. ed 2, 37. 1763 (*Orchidaceae*) nor Loefl., Reise Span. Land. Europa u. Amer. (*Violaceae*).[1] *Fagelia* Schwenke, Verh. Bataafsch. Genootsch. Rotterdam 1: 474. 1774. *Jovellana* R. & P., Fl. Peruv. 1: 12, *t. 18*. 1798.

Annual small herbs, perennial herbs, vines, lianas or shrubs, prostrate, repent, twining or erect, stems usually terete, occasionally squarrose, simple to much branched, vines occasionally more than 2 m. long, shrubs up to about 1.7 m. tall, plants glabrous to pubescent or glandular-pubescent, foliage and calyces sometimes punctate, internodes longer or shorter than the leaves. Leaves opposite or sometimes ternately verticellate, rarely fasciculate, very rarely alternate-fasciculate, petiolate or sessile, linear or aciculate to ovate, obovate or hemispherical, entire, toothed or lobed to pinnate or twice pinnate, minute to about 20 cm. long, usually 1–8 cm. long, thinly chartaceous to coriaceous, costa usually impressed above, elevated beneath, sometimes leaves bizarre, the blade broadly winging the petiole and the opposite leaves connate-perfoliate; petiole sometimes thickened, woody at base and thinly connate; flowers solitary, axillary or forming cymes, dichasia or other regular or irregular inflorescences, these usually terminal, less often lateral; calyx of four sepals, fused only at or near the base, the lobes usually a little unequal; corolla most often yellow, occasionally yellow and white or white, rarely purple, frequently blotched, banded or marked, very strongly modified and the structure difficult to verbalize, upper lip annulate or hooded, 1–12(–14) mm. long, when hooded the genitalia often included, composed of 2 wholly fused lobes, lower lip of 3 fused lobes, 6–50 mm. long, calceolate, saccate, the sac almost lacking (*C. aperta*) to sometimes almost closing the throat, the upper part of the sac proximally either underfolded and forming a glandular nectary (subgenus *Cheiloncos*) or forming a hollow external cavity and glandular or not (subgenus *Calceolaria*); stamens 2 in number and of 2 distinct

[1] Due to nomenclatural technicalities *Calceolaria* L. takes precedence and need not be conserved over *Calceolaria* (Heister) Fabr. nor *Calceolaria* Loefl., data to be published by Dr. W. Stern (Brit. Mus.) fide Mr. Hunt (Kew. Herb.) in personal correspondence, 1966.

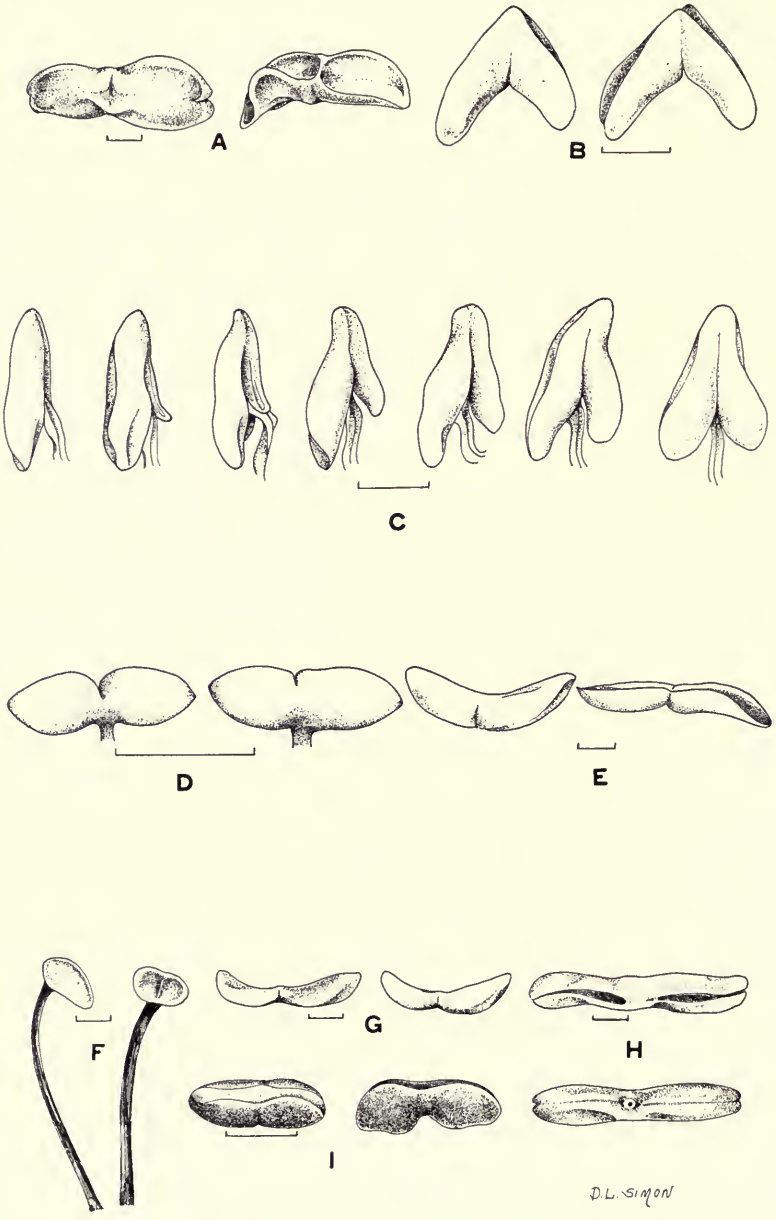

PLATE I. Anther types, *Calceolaria*: A, *herzogiana* Kränzl.; B, *lobata* Cav.; C, *phaceliaefolia* Edwin; D, *simulans* Edwin; E, *engleriana* Kränzl.; F, *utricularioides* Benth.; G, *reichlinii* Edwin; H, *pavonii* Benth.; I, *hyssopifolia* HBK.

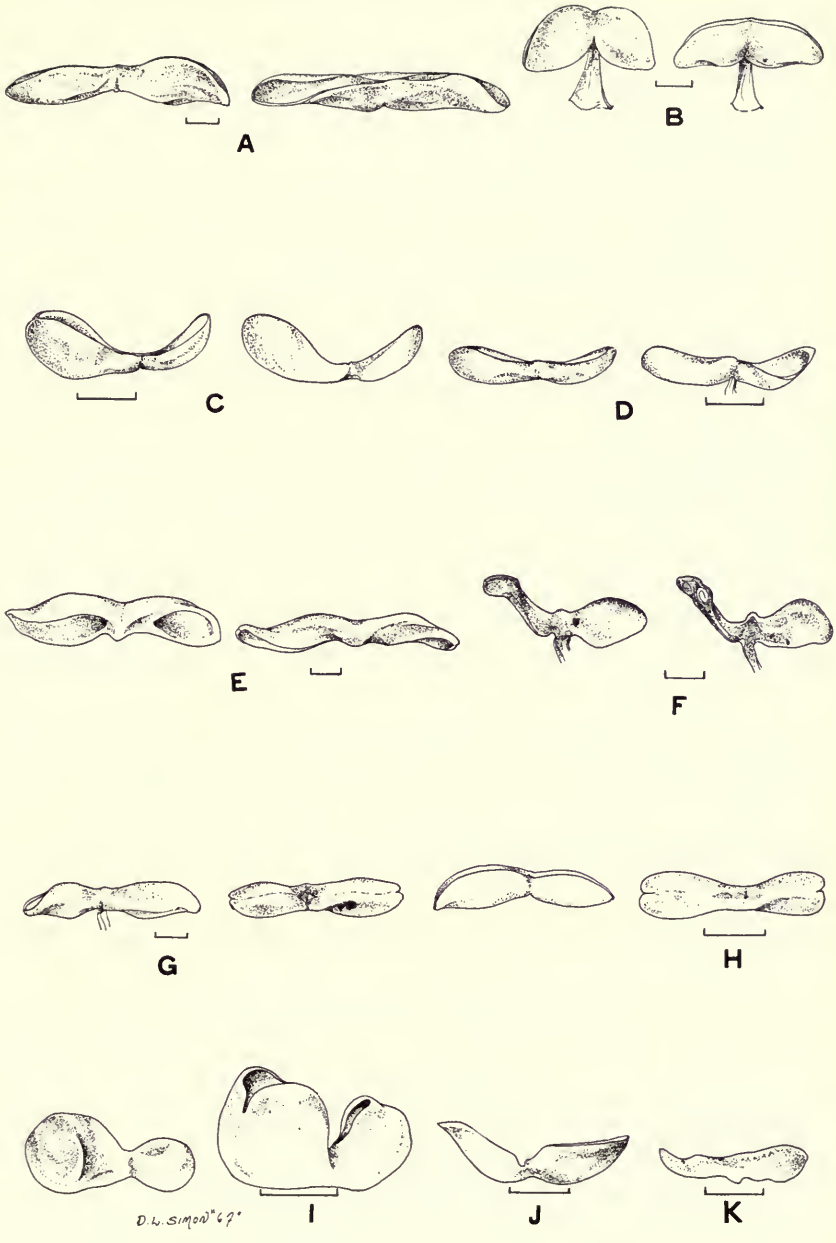

PLATE II. Anther types, *Calceolaria*: A, *endopogon* Kränzl.; B, *cypripediiflora* Kränzl.; C, *scabra* R. & P.; D, *brachyantha* Edwin; E, *solanifolia* Edwin; F, *tripartita* R. & P.; G, *salicifolia* R. & P.; H, *triloba* Edwin; I, *weberbaueriana* Kränzl.; J, *annua* Edwin; K, *delicatula* Kränzl.

kinds, either anther cells contiguous, both fertile (subgenus *Cheiloncos*) or cells separated on a connective and both fertile or one cell (highly) modified, fertile or sterile or wholly lacking (subgenus *Calceolaria*); style short, often recurved, stigma lobes united all or part way, ovary ellipsoid to ovate; fruit a septicidal capsule, secondarily barely loculicidal apically, placenta rupturing, shedding the numerous, minute, loosely tubercular-testiculate seed.

The largest genus in terms of number of species of the *Schrophulariaceae* in the new world, with 550–600 species. Predominantly of the Andes mountains of South America but representatives found through Central America, as far north as Mexico. There are three species disjunct in New Zealand.

Taxonomically difficult, due to both the number of taxa and the lack of reliable characters below the level of subgenus. The arrangements of Bentham (1846) and Kränzlin (1907) based on habit and inflorescence types have become untenable since a number of taxa include individuals that are both herbs and vines, shrubs and lianas, erect and reclining, etc. Inflorescence types, while useful, appear to have their best application at the subsectional level. Other means of arranging the species in the genus must be found. Perhaps some of the more useful characteristics in this regard in the subgenus *Cheiloncos* are the anther cells (equal or unequal and length in relation to width), the sac of the corolla (more or less than half the length of the lower lip), and the size relationships between the corolla lips.

The subgenus *Calceolaria* presents a quite distinct set of problems. My knowledge of this subgenus is far too limited to offer useful suggestions.

KEY TO THE SUBGENERA AND SPECIES

Anther cells contiguous, sessile on the filament, connective lacking, both cells fertile, very rarely one cell rudimentary, cells equal or unequal in size and shape; sac of the lower corolla lip with the upper, proximal end recurved into a glandular, tongue-like nectary, leaves entire to grossly toothed, rarely small-lobate.
Subgenus *Cheiloncos* (p. 519).

Anther cells separated by the usually well-developed connective, when connective reduced anther cells often thinly blackened on lower edge, usually (very) unequal in size, shape and position, the upper fertile, unmodified and larger than the usually modified,

fertile or sterile lower cell; sac of the lower corolla lip with the proximal end usually hollowed into an external cavity, glandular nectary present or lacking; leaves usually deeply lobed, pinnate or pinnatifid, occasionally merely coarsely toothed, rarely subentire.

Subgenus *Calceolaria* (p. 552).

KEY TO THE SPECIES OF THE SUBGENUS *Cheiloncos*

1. Filaments at least 3 times longer than the anthers, thin or very little thickened; erect or repent, usually annual herbs, rarely exceeding 20 cm. tall, very rarely a small, caespitose shrublet.
   2. Lower lip of the corolla 4–5 times longer than the upper lip; filaments little thickened, usually 1-nerved; anther locules confluent or distinct.
      3. Plants caespitose or subcaespitose; leaves dentate; shrublet. *C. plectranthifolia.*
      3. Plants with soft, branched, leafy stems; leaves entire or almost so; herb ..... *C. dichotoma.*
   2. Lower lip of the corolla not more than twice as long as the upper lip; filaments very elongate and thin or shorter and little thickened, 1- or 2-nerved; anthers all distinct.
      4. Leaf margins entire to very shallowly denticulate; filaments thin, 4 to 10 or more times longer than the anthers; flowers usually pedicellate and solitary in axils of the upper leaves, less often in simple dichasia, rarely in once- or twice-branched dichasia ..... *C. utricularioides.*
      4. Leaf margins dentate, filaments shorter and thicker, occasionally reaching 5 times longer than the anthers; flowers pedunculate, in compound, branched dichasia, in upper leaf-axils or terminal.
         4a. Leaves mostly 8 cm. long or longer ..... *C. fiebrigiana.*
         4a. Leaves up to 4.1 cm. long ..... *C. lopezii.*
1. Filaments thickened, usually shorter than the anthers, when longer, less than 3 times as long; usually perennial herbs or shrubs more than 20 cm. tall, sometimes scapose or acaulescent, or vines or lianas.
   5. One cell of the anther most often very reduced or rudimentary or lacking, occasionally the 2 cells developed, when both cells apparent the larger at least twice the size of the smaller. *C. phaceliaefolia.*

5. Both cells of the anther fully developed and functional, cells equal or unequal in size, when unequal the larger not twice the smaller.
   6. At least the upper leaves dissected to the mid-rib, small herbs, usually not more than 30 cm. tall. . . . . *C. simulans.*
   6. Leaves entire, toothed, cut or lobed, but not cut to the mid-rib, when deeply cut or lobed, woody and more than 30 cm. tall.
      7. Lower lip of the corolla not twice as long as the upper lip, lips sometimes subequal, rarely upper longer than the lower (see p. 523).
         8. Plants scapose or acaulescent. . . . . *C. scapiflora.*
         8. Plants with well-developed, leafy stems.
            9. Leaf blades or the winged or expanded petioles connate-perfoliate.
               10. Leaf blades sessile and widest at the stem. *C. connatifolia.*
               10. Leaf blades petiolate, widest at the apex of the petioles; petioles (sometimes the uppermost excepted) expanded or winged.
                  11. Lips of the corolla subequal in length and width, each ca. 7–8 mm. long. . . . . *C. sonchensis.*
                  11. Lower lip of the corolla almost twice as long as the upper lip, both lips often 12 mm. long or longer. . . . . *C. calycina.*
            9. Neither leaves nor petioles connate-perfoliate; petioles only rarely broadly winged or expanded; blades sessile or petiolate.
               12. At least most of the leaf blades less than 2 cm. long and 0.5 cm. wide, usually lanate to densely pubescent, margins frequently obviously to obscurely 3-lobed.
                  13. Anther cells equal in size.
                     14. Some leaf blades sessile, margins essentially entire or obscurely 3-lobed.
                        15. Leaves globose, trilobate. . . . . *C. inaudita.*
                        15. Leaves linear, aciculiform or filiform. *C. callunoides.*

14. Leaf blades petiolate, margins clearly 3-lobed. *C. triloba.*

13. Anther cells unequal in size. . . . . *C. pallascensis.*

12. At least most of the leaf blades more than 2 cm. long or 0.5 cm. wide or both, never 3-lobed, usually glabrous to puberulent, rarely lanate.

16. Inner surface of the calyx lobes with a distinct row of hairs near the margin, other pubescence present or lacking.

17. Blades sessile or on petioles not more than 2 mm. long.

18. Blades linear, linear-lanceolate or linearly-ligulate. . . . . *C. hyssopifolia.*

18. Blades ovate or oblong.

19. Blades sparsely puberulent above, essentially glabrous beneath. . . . *C. pearceana.*

19. Blades canescent on both surfaces. *C. pulverulenta.*

17. Blades on petioles more than 2 mm. long.

20. Anther cells subhemispherical, or broadly ovoid, almost sessile, usually bigger than the filaments.

21. Leaf blades up to 8 mm. wide. *C. hyssopifolia.*

21. Leaf blades most often more than 8 mm. wide, up to 3 cm. in width.

22. Corolla lips subequal. . . . . *C. padifolia.*

22. Upper lip only little more than half as long as the lower. . . . . *C. nivalis.*

20. Anther cells oblong, elliptic-lanceolate, or ovoid, clearly stalked, usually smaller than the filament. . . . . *C. cerasifolia.*

16. Inner surface of the calyx lobes without a definite row of hairs near the margin, glabrous to densely pubescent or glandular.

23. Leaf blades sessile.

24. Leaves ovate or oblong. . . . *C. pulverulenta.*

24. Leaves linear, linear-lanceolate or linear-ligulate.

25. Leaves glabrous. . . . . *C. hyssopifolia.*

25. Leaves lanate beneath.
C. rosmariniifolia.

23. Leaf blades petiolate.

26. Leaves linear, lance-linear or ligulate, mostly less than 9 mm. wide.

27. Leaf blades lanate beneath.
C. rosmariniifolia.

27. Leaf blades glabrous. . . . *C. hyssopifolia.*

26. Leaf blades ovate, lance-ovate, oblong elliptical or rarely obovate, rarely less than 1.3 cm. wide.

28. Anther cells unequal, 2–3 times longer than wide, large for the flower.

29. Leaf blade margins irregularly and sharply appressed-serrulate; anther cells a little unequal. . . . . *C. involuta.*

29. Leaf blade margins usually entire, occasionally; regularly, minutely serrulate or crenulate; anther cells very unequal . . . . . *C. tetragona.*

28. Anther cells equal.

30. Anther cells at least twice as long as wide, sometimes with an acumin at the apex of the filament.

31. Stems and foliage often glabrous; leaf blade margins sharp-toothed.
C. involuta.

31. At least the younger stems and foliage lanate; teeth of the leaf blade margins rounded. *C. croceopunctata.*

30. Anther cells less than twice as long as wide, occasionally wider than long, acumin lacking at the apex of the filament.

32. Leaf blades usually 3 or more times longer than wide.
C. deflexa var. *deflexa*.

32. Leaf blades up to twice as long as wide.

33. Calyx and the veins on the lower surfaces of the leaves with unicellular hairs.
C. deflexa var. *aurantiaca*.

33. Calyx and the veins on the lower surfaces of the leaves with multicellular hairs. . . . . *C. oblonga*.

7. Lower lip of the corolla at least twice as long as the upper lip.

34. Anther cells unequal in size or shape or both (see p. 529).

35. At least most of the leaf blades not exceeding 8 mm. wide, linear or almost so to sometimes narrowly ovate.

36. Corolla purple, rarely yellow with prominent purple markings; anther cells little longer than wide.
C. weberbaueriana.

36. Corolla yellow or yellow and white; anther cells much longer than wide, frequently at least twice as long as wide.

37. Leaf blades up to 6 cm. long or longer, mostly more than 1.8 cm. long. . . . . *C. procera*.

37. Leaf blades mostly not exceeding 2.5 cm. long, often less than 1.8 cm. long.

38. Teeth of the leaf blade margin many and apparent, blades narrowly ovate, rarely lanceolate or lance-linear, very rarely aciculiform, pubescence long or short, sometimes mixed with a few glandular hairs, on both surfaces, rarely pubescence sparse, tissue usually visible.
C. scabra.

38. Teeth of the leaf blade margin usually few and obscure, when apparent or many the linear, lance-linear, aculiform or rarely nar-

rowly ovate blades with short, erect pubescence, tissue sometimes hidden.

39. Calyces and lower surfaces of the leaf blades densely covered with long, white, soft hairs, at least partly obscuring the tissue; anther cells very unequal..... *C. reichlinii.*

39. Calyces and lower surfaces of the leaf blades variously pubescent or glandular-pubescent to occasionally glabrous, vesture not of long, soft white hairs; anther cells almost equal to less often very unequal.

40. Anther cells sagittate, black or dark brown..... *C. revoluta.*

40. Anther cells divergent or divaricate, yellow or light brown.

41. Corolla pilose, lower lip with the sac half or little more than half its length; calyx lobes up to 7 mm. long, frequently exceeding 5 mm. long, usually 5 mm. wide at base. *C. cajabambae.*

41. Corolla either glabrous or pubescent, vesture when present papillose (lower lip) or pilose on upper lip only, lower lip saccate either almost its entire length or less than half its length; calyx lobes not exceeding 5 mm. long and 4 mm. wide, often smaller.

42. Anthers about 2–3 mm. long; calyx lobes lance-ovate or narrowly ovate. *C. brachyantha.*

42. Anthers about 4–5 mm. long; calyx lobes ovate to broadly ovate.

43. Lateral veins clearly visible on both surfaces of the leaf blade, impressed above, elevated beneath, blades often exceeding 4 mm. wide; inflorescences racemose. *C. linearioides.*

43. Lateral veins of the leaf blade wanting or only barely visible above, blades rarely up to 4 mm. wide; inflorescences dichasiate. *C. linearis.*

35. Leaf blades mostly more than 8 mm. wide, wider than linear.

44. Leaf blades perfoliate or petioles broadly winged and connate-perfoliate.

45. The larger cell and often the smaller of each anther usually less than twice as long as wide.

46. Ovary covered with long, tangled hair; petiole margins entire or with rounded teeth or lobes. *C. calycina.*

46. Ovary glabrous or sparsely glandular-puberulent, hair descrete; petiole margins with small, sharp teeth . . . . . *C. herzogiana.*

45. The larger cell and often the smaller of each anther more than twice as long as wide.

47. Cauline leaf blades, uppermost excepted, most often wider than long, sometimes as long as wide . . . . . *C. aequilateralis.*

47. Cauline leaf blades mostly longer than wide.

48. Leaf blades puberulent with the vesture primarily on the veins . . . . . *C. pavonii.*

48. Leaf blades tomentose or lanate at least beneath, the long, often matted hair on both veins and tissue . . . . . *C. tomentosa.*

44. Leaf blades sessile or petiolate, blades and petioles neither connate nor perfoliate.

49. Anther cells sagittate and subparallel, little divergent.

50. Style 2–3 mm. long, shorter than to occasionally as long as the calyx; anther cells at least twice as long as wide; corolla yellow.

51. Leaf blades cordate at base . . . . . *C. lobata.*

51. Leaf blades broadly obtuse at base. *C. phaceliaefolia.*

50. Style 4–6 mm. long, little shorter to longer than the calyx; anther cells less than twice as long as wide; corolla white or yellow.
    52. Leaf blades pubescent beneath, epunctate. . . . . *C. ballotifolia.*
    52. Leaf blades glabrous beneath, densely red-punctate. . . . . *C. leucantha.*

49. Anther cells widely divergent or divaricate, sometimes slightly downturned distally.
    53. Anther cells less than twice as long as wide.
        54. Most of the leaf blades not exceeding 2.5 cm. long, usually less than 1.5 cm. long, bullate or plane; stem pubescence erect. *C. scabra.*
        54. Leaf blades 2.5–6.0 cm. long, usually more than 3 cm. long, plane; stem puberulence flattened or erect.
            55. Apex of leaf blade acuminate, margins regularly, shallowly toothed. *C. variefolia.*
            55. Apex of leaf blade obtuse; margins subregularly more deeply toothed. *C. pseudoscabra.*
    53. Anther cells, occasionally only one of the pair, at least twice as long as wide.
        56. Foliage glandular-pubescent on tissue.
            57. Leaf blades from 4–10 cm. long, usually 6 cm. or longer. . . . . *C. dentifolia.*
            57. Leaf blades up to 3.5 cm. long, mostly less than 3 cm. long.
                58. Leaf blades 2.0–3.5 cm. long. *C. pseudoscabra.*
                58. Leaf blades up to 2.0 cm. long, usually not exceeding 1.5 cm. long. . *C. scabra.*
        56. Foliage glabrous to pubescent, occasionally only the blade margin glandular.
            59. Foliage glabrous or occasionally very sparsely pubescent on tissue and costa above.

60. Peduncles and pedicels pubescent or papillose; calyx glabrous or pubescent.

61. Inflorescences usually 20- or more flowered, rarely less than 10; secondary and tertiary veins clearly visible beneath on the subcoriaceous, viscid leaf blade....*C. arborescens.*

61. Inflorescences usually not more than 6–8 flowered.

62. Stem and calyx lobes externally glabrous.....*C. myrtilloides.*

62. Stem and calyx lobes externally puberulent or pubescent.
C. viscosa.

60. Entire plant glabrous, occasionally calyces glaucous or pustulate.

63. Leaf-blades ovate, broadly ovate and less often elliptically ovate, rarely less than 2 cm. wide, up to about 4 cm., margins sinuate or distantly toothed, teeth broadly serrulate; ovary pubescent and glandular-pubescent; calyx lobes usually acute.....*C. endopogon.*

63. Leaf-blades lanceolate, lance-elliptic or narrowly lance-ovate, rarely exceeding 2 cm. wide, margins closely and sharply serrate or doubly serrate; ovary usually glabrous; calyx lobes usually abruptly acuminate.
C. salicifolia.

59. Foliage pubescent.

64. Foliage and calyx densely lanate, pubescence masking the tissue; leaf blade margins entire or almost so.
C. reichlinii.

64. Foliage and calyx variously pubescent, often with short curly hair, tissue visible or hidden by the pubescence; blade

margins variously toothed, less often entire.

65. All or most of the leaf blades at least twice as long as wide (occasionally 1.7–1.9 times longer than wide) usually acute to obtuse at base.
    66. Petioles gibbous and sometimes woody at base and laterally connate part way around the stem.
        67. Leaf blades entire to very finely, minutely toothed.
            C. engleriana.
        67. Leaf blades coarsely toothed.
            68. Leaf blades mostly ovate, margins regularly or subregularly crenate-dentate.
                C. bicrenata.
            68. Leaf blades mostly lanceolate to narrowly lance-ovate, margins irregularly serrate.
                C. longiinternodia.
    66. Petioles neither gibbose nor woody at base and not decurrent.
        C. scabra.
65. All or most of the leaf blades not more than 1.6 times longer than wide, sometimes almost as wide as long, often obcordate at base.
        69. Most of the mature leaf blades less than 3.5 cm. long, margins crenate-dentate or crenate-serrate.
            C. scabra.
        69. Most of the mature leaf blades more than 3.5 cm. long, up to 6.0 cm. long or longer.
            70. Leaf blade margins grossly and irregularly toothed or lobed.
                C. rhacodes.

70. Leaf blade margins subentire to finely serrate or serrulate.
C. solanifolia.

34. Anther cells equal in size and shape, rarely very slightly unequal in shape only.

71. All or most of the leaves more than 1 cm. wide (see p. 542).

72. All or most of the leaf blades less than 2 cm. long, occasionally blades 1.5–2.8 cm. long, with most 2.0–2.8 cm. long (see p. 532).

73. Petioles mostly 1–3 cm. long or longer, mostly more than half the length of the blade, sometimes longer than the blade.....*C. lobata.*

73. Petioles mostly less than 1 cm. long, only rarely (*C. hedera*) up to half the length of the blade.

74. Leaf blade densely lanate, tomentose or pulverulent beneath on both veins and tissue.

75. Leaf blade lanate beneath, of various shapes but not obovate, margins deeply toothed or lobed.

76. At least most of the leaf blades twice as long as wide or longer.....*C. aperta.*

76. At least most of the blades less than twice as long as wide.

77. Blade margins crenate-dentate; petioles ca. 1–2 mm. long or lacking.
C. cordiformis.

77. Blade margins lobed, mostly with two lateral pairs and one terminal lobe; petioles often 5–7 mm. long.
C. hedera.

75. Leaf blades tomentose or pulverulent beneath, obovate, entire to deeply toothed.

78. At least some of the leaf blades wider than long.....*C. hutchisonii.*

78. Leaf blades longer than wide.

79. Blades pulverulent beneath, margins entire or crenulate-serrulate. *C. inflexa.*

79. Blades tomentose beneath, margins regularly or irregularly, grossly or narrowly dentate, crenate or crenate-serrate.

80. Leaves ovate or obovate, margins grossly, irregularly, distantly dentate . . . . . *C. sparsiflora.*

80. Leaves elliptical or less often elliptically ovate or blades lance-elliptic, margins crenate or crenate-serrate. *C. atahualpae.*

74. Leaves glabrous, pubescent or glandular-pubescent, vesture when present on venation or on venation and tissue, but tissue neither densely lanate, tomentose nor pulverulent beneath.

81. Only the venation densely lanate, hair curled and matted.

82. Style ca. 6 mm. long; anther cells apically acuminate . . . . . *C. croceopunctata.*

82. Style 2–3 mm. long; anther cells without an apical acumin . . . . . *C. velutinoides.*

81. Venation glabrous or pubescent with short, straight, descrete hair.

83. Corolla mostly (20–) 25–37 mm. long and about half as wide; style 6–8 mm. long. *C. boliviana.*

83. Corolla mostly less than 20 mm. long, when longer almost as wide as or wider than long; style 1.5–5.0 (–6.0) mm. long.

84. Style 4–6 mm. long . . . . . *C. pearceana.*

84. Style 1.5–3.0 mm. long, rarely to 3.5 mm. long.

85. Anthers 3.2–4.2 mm. long, more than twice as long as wide.

86. Leaves usually elliptic; corolla about 25 mm. to occasionally 30 (–40) mm. long....*C. atahualpae.*

86. Leaves mostly ovate; corolla usually not more than 20 mm. long. *C. pisacomensis* var. *arequipensis.*

85. Anthers not more than 3 mm. long, mostly 1.5–2.8 mm., sometimes less than twice as long as wide.

87. Leaf blades often entire, teeth when present distant and shallow.....*C. ramosissima.*

87. Leaf blade margins distinctly closely toothed or blades few-lobed.

88. Leaf blades with few-lobed margins, lobes toothed. *C. hedera.*

88. Leaf blade margins toothed, lobes not developed.

89. Ovary glabrous to glandular-pubescent.

90. Blade margins dentate or doubly so, leaves often ternate...*C. verticillata.*

90. Blade margins serrate, serrulate or serrate-serrulate, leaves usually opposite.

91. Calyx lobes 4–6 mm. long.....*C. virgata.*

91. Calyx lobes 2.0–3.5 mm. long.

92. Leaves ovate or broadly ovate. *C. ramosissima.*

92. Leaves lanceolate to narrowly lance-ovate *C. angustiflora.*

89. Ovary densely pubescent with short, stiff, white hair. *C. sibthorpioides.*

72. At least most of the leaf blades more than 2 cm. long.

93. Leaves mostly or entirely radical or basal; plants scapose, or subscapose with stem leaves few and very reduced, occasionally caulescent with few branches. . . . . *C. corymbosa.*

93. Leaves disposed over leafy, well-developed, usually branching stems.

94. All or only the upper leaves perfoliate or connate.

95. Only the upper leaves perfoliate or connate, the others petiolate or sessile. *C. pisacomensis.*

95. All the leaves perfoliate or connate. *C. aequilateralis.*

94. Leaves not perfoliate nor connate, petiolate or sessile; petioles sometimes only thinly, partly surrounding the stem.

96. Leaf blades up to twice as long as wide (see p. 536).

97. Corolla 25 mm. long or longer, up to about 45 mm.

98. Bases of the petioles of the lower (longer) leaves only very little thickened and not at all woody and sometimes not thinly surrounding the stems or branches.

99. Anther cells at least 1.5 times longer than wide.

100. Leaf blade margins crenate-dentate, lobes lacking. *C. cypripediiflora.*

100. Leaf blade margins 5–7-lobed. *C. rhacodes.*

99. Anther cells less than 1.5 times longer than wide. . . . . *C. boliviana.*

98. Bases of the petioles of the lower leaves thickened, woody and usually surrounding the stems and branches.

101. Calyx lobes up to 10 mm. long, in life and when dry, light green to dark brown-green.

102. Leaf blade margins coarsely toothed . . . . . *C. bicrenata.*

102. Leaf blade margins entire or fine-toothed . . . . . *C. inflexa.*

101. Calyx lobes 11–15 mm. long, in life and when dry, bright yellow sometimes also red distally.
C. chrysocalyx.

97. Corolla up to 25 mm. long.

103. Leaves pubescent beneath with multiseptate hair.

104. At least most of the petioles more than 4 mm. long, up to 2 cm. long or longer . . . . . *C. heterophylla.*

104. All or most of the petioles less than 4 mm. long . . . . . *C. oblonga.*

103. Leaves variously pubescent, hair nonseptate (occasionally uni- or bi-septate) or glabrous beneath.

105. Leaf blades densely lanate, canescent or tomentose beneath.

106. Calyx lobes bright yellow or pale yellow-green, mostly 8 mm. long or longer.

107. Calyx lobes 11–15 mm. long.
C. chrysocalyx.

107. Calyx lobes up to 10 mm. long.

108. Calyx lobes bright yellow; anther cells less than twice as long as wide.
C. luteocalyx.

108. Calyx lobes pale green-yellow; anther cells twice as long as wide. . *C. bicrenata.*

106. Calyx lobes dark brownish-green to green, usually not more than 7 mm. long.

109. Leaves ferrugineous-tomentose beneath. . . . . *C. maculata.*

109. Leaves otherwise pubescent.

110. Corolla 10–20 mm. long.

111. Leaf blade margins serrate, unlobed; corolla (8–) 10–14 mm. long. *C. serrata.*

111. Leaf blade margins 5–7-lobed, lobes dentate; corolla 16–18 (–20) mm. long. . . . . *C. rhacodes.*

110. Corolla 20–35 mm. long. *C. bicrenata.*

105. Leaf blades glabrous to variously pubescent beneath but neither lanate, canescent nor tomentose.

112. Leaf blade margins few (5–9)-lobed, lobes large.

113. Petioles (1–) 2–5 cm. long or longer, frequently at least half as long as the blade, vesture often of red, stalked glands; leaf blades densely pilose on both surfaces. . . . . *C. lobata.*

113. Petioles up to 2 cm. long, usually shorter, not reaching half the length of the blade; only the calyx and flower stalks glandular-pubescent; blades when densely pubescent only beneath. . . . . *C. rhacodes.*

112. Leaf blade margins variously toothed, occasionally subentire.

114. Calyx lobes yellow or pale green-yellow; usually 8 mm. long or longer.

115. Calyx lobes 11–15 mm. long. . . . . *C. chrysocalyx.*

115. Calyx lobes mostly (5–) 8–10 mm. long. *C. bicrenata.*

114. Calyx lobes dark brown-green to green, usually not more than 8 mm. long.

116. Leaf blade margins mostly subentire or (sometimes) inconspicuously toothed, rarely (the largest) with obvious teeth.

117. Leaves usually more than 2 cm. wide. *C. variefolia.*

117. Leaves usually less than than 2 cm. wide. *C. inflexa.*

116. Leaf blade margins conspicuously toothed. (See choice 118.)

118. Calyx lobes glabrous or almost so, margins frequently ciliolate or fimbriate.

119. Lower lip of the corolla 17–25 (–28) mm. long; calyx lobes 5–9 mm. long, ciliolate.

120. Lower lip of the corolla 20–28 mm. long; calyx lobes 5–7 mm. long, ovate, acute. . . . . *C. leptantha.*

120. Lower lip of the corolla 17–18 mm. long; calyx lobes 8–9 mm. long, lanceolate, attenuate-acuminate. . . *C. scandens.*

119. Lower lip of the corolla 9–15 mm. long; calyx lobes 3–4 mm. long, sparsely setose, margins sometimes fimbriate.

121. Leaf blade teeth sharply dentate to doubly dentate. *C. verticillata.*

121. Leaf blade teeth rounded, crenate. . . . . *C. leptantha.*

118. Calyx lobes variously pubescent.

122. Calyx lobes of the mature flower less than 4 mm. long.

123. Leaf blades very short-puberulent on the upper surface; anthers less than 3 mm. long.

124. Style up to 2 mm. long; leaf blade teeth sharp. *C. ramosissima.*

124. Style 3–4 mm. long; leaf blade teeth usually rounded. *C. corymbosa* var. *perennis.*

123. Leaf blade glabrous on the upper surface; anthers more than 3 mm. long..... *C. divaricata.*

122. Calyx lobes of the mature flowers 4–7 mm. long or longer.

125. Corolla 1.5 cm. long or longer, rarely 1.5–3.5 cm. long corollas on one plant.

126. Capsule ovoid or lance-ovoid; leaf blade teeth mostly large and extrorse..... *C. bicrenata.*

126. Capsule oblong, conic-ovoid or elliptic; leaf blade teeth small and antrorse.

127. Corolla 20–35 mm. long, anther cells only little longer than wide..... *C. boliviana.*

127. Corolla mostly 15–20 mm. long; anther cells about twice as long as wide..... *C. virgata.*

125. Corolla only rarely exceeding 1.5 cm. long, usually 1.0–1.5 cm. long; anthers 1.3–1.8 times longer than wide.

128. Leaf blades rugulose or rugose; corolla up to 1.0 cm. long..... *C. rugulosa.*

128. Leaf blades plane; corollas 1.2–1.5 cm. long.

129. Calyx lobes 4–5 mm. long.. *C. corymbosa* var. *perennis.*

129. Calyx lobes 5–7 mm. long, occasionally longer. *C. virgata.*

96. Leaf blades 2 or more times longer than wide (see choice number 130).

130. Leaf blades densely lanate, canescent, tomentose or pulverulent beneath.

131. Blade pulverulent beneath, marginal teeth lacking. *C. inflexa.*

131. Blades lanate or canescent beneath, marginal teeth present or absent.

132. Anther cells up to 1.3 times longer than wide, usually less, and varying to wider than long.

133. Style 7–9 mm. long; stigma much larger in diameter than the style. . . . . *C. aperta.*

133. Style 2–4 mm. long; stigma only little larger in diameter than the style.

134. Upper lip of the corolla ca. 1 cm. long, lower lip ca. 2.5–3.5 cm. long. . . . . *C. atahualpae.*

134. Upper lip of the corolla 2–3 mm. long, lower lip ca. 10–12 mm. long. . . . . *C. lasiocalyx.*

132. Anther cells at least 1.4 times longer than wide, most often 1.7 times or more longer than wide.

135. Leaf blade lanceolate or narrowly lance-ovate, usually more than 3 times longer than wide.

136. Blade margins subentire to very finely serrulate; stems hirsute. . . . . *C. hirsutula.*

136. Blade margins very coarsely dentate; stems glabrous or almost so. . . . . *C. longiinternodia.*

135. Leaf blade ovate to broadly lance-ovate, most often less than three times longer than wide.

137. Corollas 35–45 mm. long; leaf blades ferruginious-pubescent beneath. . . . . *C. cypripediiflora.*

137. Corolla often not more than 25 mm. long, rarely reaching 35 mm.; leaf blades white- or yellow-pubescent beneath.

138. Corolla 6–12 mm. long; anther cells distally plane.

139. Calyx lobes 5–7 mm. long; corolla sac much shorter than the open, proximal part of the lip.

140. Style 1.0–1.5 mm. long; anther cells divaricate. *C. rugulosa.*

140. Style ca. 6 mm. long; anther cells sagittate, apex acuminate. . . . . *C. croceopunctata.*

139. Calyx lobes 4 mm. long; corolla sac almost equal to the proximal, non-saccate part of the lip in length. . . . . *C. serrata.*

138. Corolla ca. 13–25(–35) mm. long; anther cells often distally downturned. . . . . *C. bicrenata.*

130. Leaf blades varying from glabrous to more or less densely pubescent or glandular-pubescent beneath.

141. Lower lip of the corolla 25 mm. long or longer, the upper lip often well developed and longer than the calyx-lobes, sometimes only equaling or little shorter than the calyx lobes (*C. bicrenata*).

142. Anther cells only little longer than wide to little wider than long, frequently drying black or dark brown, occasionally white to tan, parallel to divergent; upper lip of the corolla longer than the calyx lobes (very rarely shorter).

143. Blades regularly serrulate, occasionally crenulate or denticulate to entire.

144. Style 6–8 mm. long; corolla externally puberulent. *C. boliviana.*

144. Style 2–4 mm. long; corolla externally glabrous.

145. Calyx lobes 3–4 mm. long, internally glabrous; corolla orange . . . . . *C. deflexa.*

145. Calyx lobes ca. 6 mm. long, internally with a row of marginal yellow hair; corolla yellow . . . *C. nivalis.*

143. Leaf blades irregularly crenate-dentate, densely pubescent beneath or on both sides; anthers dark brown to black when dry . . . . . *C. atahualpae.*

142. Anther cells from 1.5 to 3 times or more longer than wide, drying light brown to white, divergent or divaricate; upper lip of the corolla usually equal to or shorter than the calyx lobes.

146. Corolla (25–) 35–45 mm. long, externally pilose; petioles doubly pubescent (hair of 2 distinct sizes). *C. cypripediiflora.*

146. Corolla 25–30 mm. long; petioles glabrous to pubescent.

147. Upper leaf blades amplexicaul or sessile. *C. pisacomensis.*

147. Upper leaf blades usually short-petiolate or subsessile, occasionally sessile.

148. At least most of the leaves not more than 2.6 cm. wide.

149. Plants glabrous; leaves usually less than 3 cm. long . . . . . *C. myrtilloides.*

149. Plants pubescent; leaves up to 6 cm. long. *C. engleriana.*

148. At least most of the leaves more than 2.6 cm. wide, up to 5 cm. wide or wider.

150. Pubescence unicellular, non-septate. *C. bicrenata.*

150. Pubescence septate. . . . . *C. vulpina.*

141. Lower lip of the corolla less than 25 cm. long, upper lip most often shorter than the calyx lobes, sometimes only ca. 1 mm. long (except *C. boliviana* and *C. crenata*).

151. Corolla white or yellow and white. . . . . *C. bicrenata.*

151. Corolla most often yellow, occasionally orange.

152. Wood and foliage glabrous or almost so, only the mid-vein on the upper surface of the leaf blade sparsely pubescent.

153. Corolla usually orange, occasionally yellow, anthers less than twice as long as wide. . . . . *C. deflexa.*

153. Corolla yellow; anthers at least twice as long as wide, usually longer. . . . . *C. myrtilloides.*

152. Wood or foliage or both pubescent or puberulent.

154. Hair on stems and branches septate.

155. Calyx lobes ca. 10 mm. long; leaf blades coarsely, irregularly toothed. . . . . *C. vulpina.*

155. Calyx lobes ca. 3–5 mm. long; leaf blades with fine, regular teeth.

156. Corolla ca. 20 mm. long. . . . . *C. crenulata.*

156. Corolla ca. 10–12 mm. long. . . . . *C. lasiocalyx.*

154. Hair on stems and branches lacking obvious septa.

157. Anther cells at least twice as long as wide, often distally downturned.

158. Leaf blades lanceolate, lance-elliptic or narrowly lance-ovate, when narrowly lance-ovate frequently more than 2.5 times longer than wide, margins sometimes entire or almost so.

159. Leaves mostly entire or subentire, occasionally shallowly serrulate.

160. Upper lip of the corolla 3–5(–6) mm. long, sometimes equaling, rarely exceeding the length of the calyx lobes. . . . . *C. engleriana.*

160. Upper lip of the corolla ca. 1.5–2.5 mm. long, much shorter than the calyx lobes. *C. rhizomatosa.*

159. Leaves variously serrate or serrulate, occasionally crenate, only rarely the young blades entire or subentire. . . . . *C. angustiflora.*

158. Leaf blades ovate, broadly elliptic or broadly lance-ovate, when broadly lance-ovate blades less than 2.5 times longer than wide, margins deeply and irregularly cut (except *C. viscosa*).

161. Leaves glabrous. . . . . *C. viscosa.*

161. Leaves pubescent.

162. Leaves and calyx appressed-pubescent. *C. colcamarensis.*

162. Pubescence of leaves and calyx otherwise. *C. bicrenata.*

157. Anther cells less than twice as long as wide, distally usually plane.

163. Leaves lanceolate, entire or subentire, occasionally (*C. hirsutula*) a few leaves serrulate.

164. Calyx lobes 10–12 mm. long. . *C. chrysosphaera.*

164. Calyx lobes mostly 5–6 mm. long, occasionally reaching 7 mm. . . . . *C. hirsutula.*

163. Leaves usually ovate, broadly elliptical or lance-ovate, sometimes lanceolate, when lanceolate margins usually crenate, dentate or serrate and frequently the teeth irregular.

165. Leaves lanceolate, irregularly toothed, rarely teeth regular, or leaves ovate or elliptic with small or obsolete teeth.

166. Blades lanceolate, clearly irregularly toothed.

167. Lower corolla lip saccate less than half its length.

168. Upper lip of the corolla longer than the calyx lobes, ca. 4 mm. long. . *C. crenata.*

168. Upper lip of the corolla shorter than the calyx lobes, ca. 1–2 mm. long. *C. angustiflora.*

167. Lower corolla lip saccate at least three-fourths of its length, throat almost closed. *C. glauca.*

166. Blades ovate, broadly elliptical or elliptically ovate, teeth small to almost obsolete.

169. Calyx lobes mostly 5–6 mm. long or longer.

170. Calyx lobes lanceolate; style 6–8 mm. long..... *C. boliviana.*

170. Calyx lobes mostly ovate; style 2 mm. long..... *C. variefolia.*

169. Calyx lobes mostly 3 mm. long. *C. crenata*

165. Leaves ovate, broadly elliptic or lance-ovate, marginal teeth or lobes obvious, large, regular or irregular.

171. Calyx lobes lanceolate.

172. Calyx lobes 8–9 mm. long, acuminate. *C. scandens.*

172. Calyx lobes 3–4 mm. long, acute. *C. verticillata.*

171. Calyx lobes ovate or elliptic-ovate or occasionally lance-ovate, usually acute.

173. Calyx lobes 7–10 mm. long.

174. Style 3–4 mm. long.

175. Leaf blades sharply serrate or serrate-serrulate... *C. virgata* var. *llamaensis.*

175. Leaf blades variously doubly and irregularly dentate or crenate, only rarely serrate..... *C. bicrenata.*

174. Style 1.5–2.0 mm. long.

176. Bases of the petioles of the larger leaves swollen and woody; corolla sac less than half the length of the lower lip..... *C. rugulosa.*

176. Bases of the petioles of the larger blades little if at all swollen or woody; corolla sac at least half the length of the lower lip..... *C. colcamarensis.*

173. Calyx lobes 3–7 mm. long.
177. Calyx glabrous.....*C. verticillata.*
177. Calyx pubescent or puberulent.
178. Corolla 1 cm. wide and 1.5 cm. long or longer.....*C. bicrenata.*
178. Corolla up to 7 mm. wide and only rarely more than 1.3 cm. long, then up to 1.5 cm. long.
179. Corolla sac at least half the length of the lip.
180. Inflorescences compound and well branched, paniculate or panicles of dichasia; lower lip of the corolla saccate about three-fourths of its length...*C. glauca.*
180. Inflorescences simple or once-branched; lower lip of the corolla saccate about half its length. *C. lasiocalyx.*
179. Corolla sac less than half as long as the lower lip.
181. Calyx lobes of the mature flowers less than 4 mm. long. *C. ramosissima.*
181. Calyx lobes of the mature flowers 4–7 mm. long.
182. Leaf blades rugulose or rugose; corolla up to 1 cm. long. *C. rugulosa.*
182. Leaf blades plane; corolla 1.2–1.5 cm. long.....*C. virgata.*

71. At least most of the leaf blades less than 1 cm. wide. (Please return to the margin; entry 183.)

183. At least most of the leaves linear, filiform or aciculiform, less than 3 mm. wide, margins entire or with 2–3-pairs of teeth.
184. Anther cells sagittate, each ca. 1.5–3.0 mm. long; style 4–5 mm. long; upper lip of the corolla ca. 3–4 mm. long; leaf blades tomentose or pulverulent.....*C. revoluta.*
184. Anther cells divaricate or divergent, each ca. 0.7–1.5 mm. long; style 1.5–3.0 mm. long; upper lip up to 2 cm. long;

leaf blades glabrous, puberulent or pulverulent, sometimes glandular.

185. Leaf blades, stems and branches glabrous or almost so. *C. alba.*

185. Leaf blades and the newer wood variously pubescent or puberulent and often pulverulent, sometimes glandular.

186. At least most of the leaf blades more than 1.5 cm. long. *C. linearis.*

186. At least most of the leaf blades less than 1.5 cm. long.

187. Anther cells mostly 2 or more times longer than wide.

188. Leaves pulverulent beneath, mostly about 1 mm. wide, margins entire, leaf-fascicles and leaves alternate. . . . . *C. alternifolia.*

188. Leaves glandular-puberulent, either 2–3 mm. wide with entire margins, or about 1 or 2 mm. wide with 2–3 pairs of apical teeth, leaf-fascicles and leaves opposite. . . . . *C. brachyantha.*

187. Anther cells about as long as wide to 1.6 times longer than wide. . . . . *C. callunoides.*

183. At least most of the leaf blades 4–10 mm. wide or when up to 3 mm. wide, broader than linear; margins toothed, lobed or occasionally entire.

189. Leaf blades up to 3 mm. wide, broader than linear, margin toothed or lobed, occasionally entire.

190. Leaf blade margins distinctly revolute, sometimes rolled or folded to the midrib, toothed or with 3–9 pairs of lobes, rarely more than 9 pairs.

191. Calyx ca. 4 mm. long; corolla ca. 8–10 mm. long; pedicels sometimes 1–2 cm. long, usually englandular; south Peru. . . . . *C. santalinoides.*

191. Calyx ca. 7–8 mm. long; corolla ca. 13–17 mm. long; pedicels usually less than 1 cm. long, glandular; north Peru. . . . . *C. incarum.*

190. Leaf blade margins plane or weakly revolute, toothed or with 1–2 pairs of lobes or sometimes entire.

192. Walls of anther cells and septa very thick, polleniferous part of cells only little more than half of the locule. *C. scabra.*

192. Walls of the anther cells and septa thin, polleniferous area at least three-fourths of the locules.

193. Petioles gibbose, woody at base and surrounding the node as a thin collar; internodes long, leaves distant. *C. ajugoides.*

193. Petioles neither swollen at base nor woody, descrete; internodes short, leaves crowded.

194. Leaves, stems and inflorescences lanate.

195. Calyx lobes pubescent within. . *C. decus montium.*

195. Calyx lobes glabrous within. . . . . *C. argentea.*

194. Occasionally leaves or stems or inflorescences lanate, never the entire plant.

196. Style 4–5(–6) mm. long. . . . . *C. pearceana.*

196. Style 1.5–4.0 mm. long.

197. Leaf blade with 1 pair of broad, divergent lobes at the base, apex obtuse or rounded, tissue lanate beneath. . . . . *C. triloba.*

197. Leaves not as above, lanceolate to ovate or cuneiform, glabrous to lanate, entire to variously lobed.

198. Leaf blade margin entire or few-crenulate. *C. myriophylla.*

198. Leaf blade margins variously toothed or lobed.

199. Leaves triangular or broadly ovate or ovate, usually less than twice as long as wide.

200. Leaf blades ovate, minute, up to 5 mm. long and 4 mm. wide, margin regularly with 5–7 pairs of small lobes. *C. millefoliata.*

200. Leaf blades triangular to ovate, mostly more than 5 mm. long, regularly or irregularly toothed or lobed.

201. Calyx lobes 3–4 mm. long; corolla up to 10 mm. long. . . . . *C. inamoena.*

201. Calyx lobes 5–8 mm. long; corolla ca. 15 mm. long . . . . . *C. cuneiformis.*

199. Leaf blades lanceolate to lance-ovate, oblong-ovate or cuneately obovate, usually at least twice as long as wide.
202. Lower lip of the corolla saccate less than half its length. . . . . *C. sparsiflora.*
202. Lower lip of the corolla saccate at least half its length.
203. Leaves lanceolate or lance-subovate. *C. extensa.*
203. Leaves oblong ovate.
204. Leaves glabrous above. *C. bartsiaefolia.*
204. Leaves pubescent above. *C. cuneiformis.*

189. Leaf blades 4–10 mm. wide.
205. Plants annual, less than 10 cm. tall; flower less than 8 mm. long . . . . . *C. pumila.*
205. Plants perennial, more than 10 cm. tall, up to 50 cm. or taller; flowers most often 10 mm. long or longer.
206. Leaves entire or obscurely few-toothed, more than 3 times longer than wide.
207. Plants silvery lanate.
208. Calyx lobes 5–8 mm. long, acute.
209. Calyx lobes ca. 8 mm. long and 3 mm. wide at base, lance-ovate, internally with a row of hair along the margins . . . . . *C. decus montium.*
209. Calyx lobes 5–6 mm. long and 4–5 mm. wide at base, ovate, internally glabrous . . . . *C. argentea.*
208. Calyx lobes 4 mm. long, obtuse . . *C. rhododendroides.*
207. Plants glabrous or variously pubescent, not lanate.
210. Style (3.5–) 4.0–5.5 mm. long.
211. Subshrubs; corolla sac much shorter than the non-saccate part of the lower lip. *C. rhododendroides.*
211. Lianas; corolla sac equal to or longer than the non-saccate, proximal part of the lip . . . *C. inflexa.*
210. Style 1.5–3.0 mm. long.
212. Calyx lobes 10–12 mm. long . . . *C. chrysosphaera.*

212. Calyx lobes 3.5–7.0 (–8) mm. long.

213. Anther cells at least twice as long as wide.

214. Leaf blades less than 2 cm. long. *C. brachyantha.*

214. Leaf blades more than 2 cm. long.

215. Lower lip of the corolla saccate more than half its length..... *C. engleriana.*

215. Lower lip of the corolla saccate less than half its length..... *C. rhizomatosa.*

213. Anther cells less than twice as long as wide.

216. Calyx lobes internally pubescent or puberulent over most of the tissue.. *C. angustiflora*

216. Calyx lobes internally glabrous or with a row of hairs near the margins and at the apex.

217. Upper corolla lip longer than the calyx lobes..... *C. rosmariniifolia.*

217. Upper corolla lip shorter than the calyx lobes.

218. Leaf blades covered with a short, dense scurfy, brownish indument beneath (pulverulent)..... *C. inflexa.*

218. Leaf blades most often hirsute, varying to glabrous..... *C. hirsutula.*

206. Leaf blade margins obviously toothed or lobed, or if entire or subentire less than three times longer than wide.

219. Leaf blades obviously lobed and sometimes secondarily toothed.

220. Blades lanate on tissue beneath.

221. Blades with 1 pair of lobes near the base. *C. triloba.*

221. Blades with at least 2 pairs of lobes, one or more pairs at or above the middle.

222. Blades less than 1 cm. long.... *C. millefoliata.*

222. At least some of the blades 1 cm. long or longer. *C. hedera.*

220. Blades usually sparingly pubescent on veins and tissue beneath or densely glandular, or canescent, tomentose or pulverulent.
223. Blades lanceolate in outline, occasionally lance-ovate, 2 or more times longer than wide.
224. Blades usually tomentose beneath, margins little revolute or plane.....*C. cuneiformis,*
224. Blades glandular beneath, margins revolute. often folded to the midrib.....*C. incarum.*
223. Blades ovate to very broadly ovate in outline, usually less than twice as long as wide.
225. Calyx lobes 6–8 mm. long, anthers divergent.
226. Calyx lobes 7–8 mm. long, glandular-pilose. *C. cuneiformis.*
226. Calyx lobes ca. 6 mm. long, puberulent to glabrous.....*C. collanensis.*
225. Calyx lobes 4–5 mm. long.
227. Anthers sagittate, blades mostly more than 1.5 cm. long.....*C. lobata.*
227. Anthers divaricate, blades mostly or entirely less than 1.5 cm. long.....*C. inamoena.*

219. Leaf blades entire to toothed, lobes lacking.
228. Blades densely lanate beneath, at least on the veins and veinlets.
229. Only the venation lanate.....*C. croceopunctata.*
229. Venation and tissue lanate.
230. Anther cells less than twice as long as wide.
231. Blade margins toothed.....*C. sparsiflora.*
231. Blades entire.....*C. rhododendroides.*
230. Anther cells at least twice as long as wide.
232. Teeth of the blade margins small, sharp, blade occasionally subentire..*C. velutinoides.*
232. Teeth of the blade margin large, rounded. *C. cordiformis.*
228. Blades glabrous to variously pubescent but indument not long and lax.
233. At least some of the blades wider than long. *C. hutchisonii.*

233. All the blades longer than wide.
234. At least most of the blades less than 1.2 cm. long.
235. Style 3–5(–6) mm. long, mostly 3.5–5.0 mm. long.
236. Calyx lobes ca. 3 mm. long. *C. angustiflora.*
236. Calyx lobes ca. 6 mm. long. . *C. pearceana.*
235. Style 1–3 mm. long, mostly up to 2.5 mm.
237. Ovary densely beset with erect, short, stiff, white hair. . . . . *C. sibthorpioides.*
237. Ovary glabrous to glandular-pubescent.
238. Polleniferous part of the anther-cells only little more than half their volume, walls and septa thick. . . . . *C. scabra.*
238. Polleniferous part of the anther-cells at least three-fourths of their volume, walls and septa thin.
239. Leaves broadest at or near the bases.
240. Calyx lobes up to 4 mm. long.
241. Blades brown-pulverulent beneath. . . . . *C. bartsiaefolia.*
241. Blades with white pubescence. *C. inamoena.*
240. Calyx lobes 5–6 mm. long, mostly more than 5.0 mm.
242. Blade margins serrulate with very shallow, sharp, appressed serrulations. . . . . *C. virgata.*
242. Blade margins crenate, the often rounded teeth extrorse.
243. Corolla 17–22 mm. long, occasionally longer. . . . . *C. aurea.*
243. Corolla up to 12 mm. long. *C. collanensis.*
239. Leaves broadest at or near the middle.
244. Calyx lobes 3.0–3.5 mm. long.

245. Lower lip of the corolla saccate more than half its length.
C. humilis.

245. Lower lip of the corolla saccate less than half its length.
C. ramosissima.

244. Calyx lobes 4.5–8.0 mm. long, mostly 5–7 mm. long.

246. Leaf blades less than twice as long as wide.

247. Corolla sac often oblique, lower lip of the corolla 12–15 mm. long.....*C. virgata.*

247. Corolla sac hemispherical, lower lip of the corolla ca. 17 mm. long.....*C. aurea.*

246. Leaf blades at least twice as long as wide.

248. Teeth when present on the leaf blade margin few, 2–4 pairs and shallow, less than one-fifth the width of the blade.
C. myriophylla.

248. Leaf blade margins always toothed or lobed, teeth few to more often more than 4 pairs, often at least one-fifth the width of the blade.

249. Calyx lobes and capsules glandless.

250. Leaves sometimes oblong or cuneate-obovate, narrowed to base and apex, dentate on upper one-half to two-thirds.
C. sparsiflora.

250. Leaves mostly subovate to ovate, sometimes nar-

rowed to apex only, toothed the entire length.

251. Calyx lobes 4 mm. long and 3 mm. wide at base. *C. bartsiaefolia.*

251. Calyx lobes (5–) 6 mm. long and 4 mm. wide at base..... *C. extensa.*

249. Calyx lobes and capsules glandular... *C. cuneiformis.*

234. At least most of the leaf blades more than 1.2 cm. long.

252. Calyx lobes 3–4 mm. long.

253. Style 4–5 (–6) mm. long.

254. Blade margins coarsely doubly dentate. *C. verticillata.*

254. Blade margins entire or crenulate.

255. Leaf blades ovate.. *C. rhododendroides.*

255. Leaf blades lanceolate, elliptic or narrowly lance-ovate. *C. inflexa* var. *altissima.*

253. Style 1.5–4.0 mm. long.

256. Leaf blades up to twice as long as wide, usually less, lance-ovate or ovate, crenate to serrate.

257. Calyx and pedicels glandular-pubescent..... *C. inamoena.*

257. Calyx and pedicels eglandular. *C. ramosissima.*

256. Leaf blades mostly at least twice as long as wide, occasionally less than twice as long as wide, then broadly serrate.

258. Upper lip of the corolla ca. 4–5 mm. long, usually equaling to longer than the calyx lobes..... *C. glauca.*

258. Upper lip of the corolla ca. 1–3 mm. long, shorter than the calyx lobes.

259. Leaf blades usually not exceeding 2 cm. long..... *C. ajugoides.*

259. Leaf blades usually longer than 2 cm., up to 6 cm.

260. Uppermost leaf blades narrowly lanceolate with fewer and smaller marginal teeth than lower blades, occasionally entire; calyx lobes elliptical, obtuse or acute, pubescent or puberulent on both sides. *C. angustiflora.*

260. Uppermost leaf blades narrowly ovate, marginal teeth as the lower blades; calyx lobes lance-ovate or lanceolate, internally glabrous, acute or short-acuminate. *C. verticillata.*

252. Calyx lobes 5–8 mm. long, rarely longer.

261. Style 4–6 mm. long or longer.

262. Flowers 20–37 mm. long; calyx lobes 7–8 mm. long ..... *C. boliviana.*

262. Flowers 12–20 mm. long; calyx lobes ca. 5–6 mm. long..... *C. pearceana.*

261. Style (1–) 2.0–3.0 (–3.5) mm. long.

263. Leaf blade margins entire or subentire.

264. Anther cells at least twice as long as wide; calyx glandular..... *C. viscosa.*

264. Anther cells less than twice as long as wide; calyx pubescent.... *C. inflexa.*

263. Leaf blade margins obviously toothed.

265. Upper lip of the corolla 8–10 mm. long, often exceeding the calyx. *C. atahualpae.*

265. Upper lip of the corolla up to 6 mm. long, most often little to much shorter than the calyx lobes.

266. Blade margins with rounded teeth, crenate.

267. Corolla mostly 15–22 mm. long, occasionally longer.

268. Leaf blades less than twice as as long as wide.....*C. aurea.*

268. Leaf blades more than twice as long as wide.....*C. extensa.*

267. Corolla up to 12 mm. long. *C. collanensis.*

266. Blade margins with sharp teeth, serrate, serrulate or dentate.

269. Lower lip of the corolla saccate more than half its length. *C. inflexa.*

269. Lower lip of the corolla saccate less than half its length.

270. Leaf blades glabrous. *C. viscosa.*

270. Leaf blades puberulent, pustular or glandular, at least above.

271. Calyx lobes 7–8 mm. long, scabrous; capsule conic. *C. macrocarpa.*

271. Calyx lobes 5–7 mm. long, pilose or glandular-pilose; capsule ovoid.

272. Calyx lobes 6–7 mm. long, densely pilose externally. *C. virgata.*

272. Calyx lobes 5 mm. long, glandular-pilose on both surfaces....*C. sparsiflora.*

KEY TO THE SPECIES OF THE SUBGENUS *Calceolaria*

1. Both cells of the anther clearly fertile, the lower cell sometimes a little modified.
   2. Plants subscapose.....*C. subscaposa.*
   2. Plants with well-developed leafy stems.
      3. Leaf blades more than 3 cm. long.
         4. Connective shorter than the anther cells that sometimes appear to be contiguous.....*C. delicatula.*

4. Connective longer than at least one of the anther cells.
   5. Capsule usually equal to or longer than the calyx, upper leaf blades pinnate, some twice pinnate; flowers borne in terminal or less often lateral dichasia....*C. pinnata.*
   5. Capsule shorter than the calyx lobes; upper leaf blades pinnate or not; flowers solitary, axillary....*C. palustris.*
3. Leaf blades less than 3 cm. long.
   6. Lower lip of the corolla less than twice the length of the upper.....*C. flosparva.*
   6. Lower lip at least twice as long as the upper.
      7. Connective longer than the anther cells....*C. palustris.*
      7. Connective shorter than the anther cells.
         8. Lower lip of the corolla less than 12 mm. long. *C. sarmentosa.*
         8. Lower lip of the corolla more than 12 mm. long.
            9. Leaf blades, at least the upper dissected to the midrib, the pinnae lanceolate.....*C. delicatula.*
            9. Leaf blades only rarely, if at all, dissected to the midrib, when so dissected, pinnae usually ovate. *C. annua.*

1. The lower cell of each anther sterile or so modified as to appear sterile, or lacking.
   10. Connective longer than at least one of the anther cells.
      11. At least the larger leaf blades with bases thinly decurrent over the length of the connate petioles and frequently with more than 3 pairs of pinnae.
         12. Pinnae most often decreasing in size base to apex; blades, especially the lower, more than 12 cm. long and mostly with 7 or more pairs of pinnae; nodes frequently beset with dark exudate-filled pubescence...*C. grandepinnata.*
         12. Pinnae increasing in size from base to apex; at least most of the blades less than 12 cm. long and usually with not more than 4 pairs of pinnae (rarely to 6 pairs); nodal pubescence as on the stem.....*C. tripartita.*
      11. Leaves not at all or only short-decurrent, rarely very thinly decurrent the length of the petiole; petioles descrete; blades most frequently merely dentate, sometimes varying to with 3 pairs of pinnae.....*C. ranunculoides.*

10. Connective shorter than the anther cells.
    13. Leaf blades more than 3 cm. long.
        14. Both anther cells developed, one sterile; lower lip of the corolla longer than wide.....*C. tripartita.*
        14. One anther cell frequently wholly lacking; lower lip of the corolla wider than long.
            15. Leaf blades often merely dentate.....*C. chaetostemon.*
            15. Leaf blades mostly deeply incised or pinnate. *C. micrantha.*
    13. Leaf blades less than 3 cm. long.
        16. Connective not auriculate.
            17. Capsule wider than long.....*C. tripartita.*
            17. Capsule longer than wide.....*C. tenuis.*
        16. Connective auriculate near the septum apex. *C. micrantha.*

Calceolaria aequilateralis Edwin, Phytologia 19: 369. 1970.

Perennial herb, often scrambling, stem soft, 4-angled, frequently pubescent or puberulent, especially below. Leaves bizarre, petioles broadly winged, connate, broadest at the stem, usually serrulate, at least on the lower half, occasionally irregularly dentate, usually a little shorter than the blade, midvein flattened, elevated beneath, uppermost blades sessile, broadly ovate, usually the smallest, remaining blades (petiolate) very broadly deltoid or triangular, less often ovate-triangular, frequently wider than long or as wide as long, very big for the genus, 8–12 (–14) cm. long and 9–14 (–15) cm. wide, irregularly coarsely crenate-dentate, narrowing to apex, cordate or truncate at base, occasionally broadly ovate, puberulent; inflorescences usually few-flowered, ca. 7–15, dichasiate; flowers up to ca. 40 mm. long, sepals up to 23 mm. long, broadly ovate, acute or acuminate, glabrous or puberulent on lower half, upper corolla lip ca. 8–15 mm. long, cucullate, lower lip to 30–35 mm. long, orifice almost closed, nectiferous flap much lighter colored, sac much inflated in life, glabrous, except for a tuft of hair inside at base; anthers large, cells usually ca. 2 times as long as wide, mostly unequal, occasionally subequal or equal, filaments short; style 8–10 mm. long; ovary pubescent; capsule broadly ovoid, narrowed to apex, densely pubescent, much smaller than and overtopped by the closely investing calyx.

Sporadic, from Prov. Amazonas in the north to Cuzco in the south.

Amazonas: Rocky cliff, alt. 3,300–3,400 m., *Pennell 15694*; Cerro Puma-urco southeast of Chachapoyas. Rocky bank near summit, alt. 3,300–3,400 m., *Pennell 15905*.—Cuzco: Macchu Picchu, Urubamba Valley, alt. ca. 5,000 ft., *Balls 6812*; 2,000 m. *Rauh-Hirsch P 854*; *809*.—Lima: Hualgayoc: Monte Seco, alt. 1,800 m., *Soukup 3834*.—Pasco: Huariaca, wet place, alt. ca. 9,500 ft., *Macbride 3124*.

Calceolaria ajugoides Kränzl. in Engler, Bot. Jahrb. 50: Beibl. 110, 75. 1914.

Shrub (ex desc. up to 50 cm. tall, dark red branches curving-ascending) with wood pilose or only sparsely so, foliage usually densely tomentulose and internodes 2.5–5.0 cm. long, usually longer than the leaves. Leaves of the branches short-petiolate, usually ternate, lanceolate, few-dentate, upper often linear and entire, up to 2.5[1] cm. long and 4.0 mm. wide, usually less than 2.0 mm. wide, sparsely pilose above, usually densely tomentulose beneath, the tissue obscured by the vesture; petioles dilated and woody at base, thinly coalescing and bearing in their axils abbreviated shoots whose leaves are linear, entire and subsessile or sessile; inflorescences long and lax dichasia or modified dichasia, few-flowered, the basal stalks only once branched; bracts linear; peduncles and pedicels pilose; calyx split to the base, sepals ovate, 3–4 mm. long and ca. 1 mm. wide at base, densely pilose; corolla up to 20 mm. long, upper lip reduced to a narrow ring; sac of the 18 mm. long lower lip ample, usually a little more than half its length and ca. 1.2 cm. wide, minutely pilose; stamens small, filaments ca. 1.0–1.5 mm. long, anthers a little longer than wide; style 2.0–3.5(–4.0) mm. long, ovary glabrous or sparsely puberulent; capsule unknown.

Ayacucho: Confluence of Lomas and Yanca Rivers at alt. 3,000 m., *Weberbauer 5765* (Isotype F); Ocros[2] alt. 3,200 m., *Weberbauer 5801*.

Calceolaria alba R. & P., Fl., Peruv. 1: 19, *t. 27. fig. a.* 1798.

Subshrub, glabrous or almost so, stems branched and stems and bracts both with abbreviated shoots clustered in leaf-axils; leaves sessile, filiform, up to 2.5 cm. long, often less than 2.0 cm. long and

[1] Ex Kränzlin, no leaves approaching this length seen, even on the isotype.

[2] Erroneously attributed to Dept. Ancash by the collector; probably collected at Parinacochas, fide Pennell annotation.

rarely reaching 2 mm. wide, entire, costa elevated beneath, abbreviated shoots in many axils densely foliose, therefore axils of leaves of the stem and branches appearing very densely foliate; inflorescences few- to many-flowered, lax, distant, paniculate or cymose clustered; pedicels, calyces and sometimes the corollas minutely papillose-glutinous or -tomentose; peduncles 2–3 cm. long; pedicels ca. 3–5 mm. long; calyx lobes ovate to elliptical, obtuse, 2.0–2.5 mm. long and ca. 1.0–1.2 mm. wide; corolla white, drying yellow or both corolla and calyx yellow (ex Kränzl.) upper lip annulate, ca. 1 mm. wide, lower lip narrowed at base, up to 1.2 cm. long and 7–8 mm. wide; filaments minute, the divaricate anthers about 1.5 mm. end to end; style about 1.5 mm. long, ovary sparsely papillose; fruit unknown.

Sin. Loc.: *Dombey s.n.*

Also known from Chile and Argentina.

Calceolaria alternifolia Cav., Icon. Rar. 5: 28, *t. 445, f. 2.* 1799.

Differing from *C. linearis* R. & P. to which it is closely allied in the following ways: the branches all very short and strictly appressed to the stem, occasionally elongate; anthers much smaller and about 2 times as long as wide, the ovoid to almost round capsules lacking a suddenly narrowed, long upper half; some of the leaves subopposite; the upper lip of the deep-yellow corolla only a little shorter than the 4–5 mm. long calyx lobes, the lower lip reaching up to 20 mm. long, abruptly narrowed throughout the non-saccate proximal half.

Amazonas: Llui, alt. 11,000 ft., *Carricker, s.n.*; Cerro Puma-urco, summit, 3,400–3,500 m., *Pennell 15909.*—Ancash: Catuc, 15 mi. east of Huaraz, dry river bluffs, ca. 10,500 ft., *Macbride & Featherstone 2511.*—Piura: Huancabamba (Porculla?) Piura Divide, alt. 8,500 ft. *Sandeman 4290.*—Sin. Dept.: Buenaventura, *Nee s.n.*; Chasqui, stream banks, alt. ca. 10,500 ft., *Macbride & Featherstone 1772,* ("Okush Romaro").

Calceolaria angustiflora R. & P., Fl. Peruv. 1: 17, *t. 28a.* 1798, non Hook. *C. terniflora* Cav., Icon. Rar. 5: 30, *t. 450, f. 2.* 1799.

Upright, erect, puberulent subshrub with usually verticillate leaves, mostly with ascending, elongate branches, abbreviated branches sometimes present in leaf-axils. Leaves lanceolate to more often lance-elliptic or narrowly lance-ovate, 1.5–4.6 cm. long and 0.7–2.1 cm. wide, serrate or serrate-serrulate, rarely uppermost narrowly linear and subentire, apex acute, base obtusish, usually puber-

ulent on both surfaces, more densely beneath, especially on the veins, occasionally puberulent only beneath, rarely glabrous, often with raised, red-black, glandular punctations, short-petiolate, occasionally sessile; flowers in elongate panicles or dichasia; peduncles and pedicels pilose, up to 3 cm. long; calyx pilose, segments ovate or elliptical, ca. 2.5–3.5 mm. long, pubescent on both surfaces, often white margined; upper lip of the corolla shorter than the sepals, lower lip narrowed proximally, elongate, distally flaring, saccate to about half its 10–18 mm. length, the sac only little narrower than long, slightly upturned, purple marked internally on lower surface; anther cells equal, less than to more than 2 times longer than wide, divaricate or almost so, not exceeding 2 mm. long, each cell usually less than 1 mm. long, when exceeding 2 times longer than wide sometimes downturned at the free ends; style erect 2–4(–5) mm. long, ovary glabrous to densely beset with black-red glands; capsule shorter than and invested by the calyx, glabrous or glandular as the ovary, ovoid, narrowed to the blunt apex.

Ancash: Monterrey, 3 km. below Huaraz, stony slope, alt. 3,000–3,100 m., *Pennell 15303*; slope along stream Río Santa, opposite Huaraz, alt. 3,100–3,150 m., *Pennell 15327*; Banks, alt. 2,700–2,900 m., Colca, *Pennell 15383*; toward El Cerro Shaurema, southeast of Huaraz, alt. 3,500 m., *Pennell 15427*; Québrada de Huaqui, Huaraz, alt. 3,000–3,050 m., *Pennell 15433*; Hillside north of Huaraz, alt. 3,250 m., *Pennell 15443*.—Ayacucho: Coracora, alt. 2,800–2,900 m., *Weberbauer 5791*.—Lima: Prov. Huarochiri, Surco, shore of rivulet, alt. ca. 2,000 m., *Asplund 11060*; Huaquisha, above Surco, alt. 2,600–2,700 m., *Ferreyra 6073*; Surco, rocky banks, alt. 2,300–2,700 m., *Pennell & Ferreyra 15240*; South of Surco, alt. 2,400–2,500 m., *Pennell & Ferreyra 15244*; Matucana, *Rose & Rose 18638*; Sin Loc.: *Ruiz & Pavon s.n.*

The collections from Ancash have the glandular ovaries and capsules. The Ayacucho collection has the least pubescence. Although most collections are from Lima Department, this taxon is probably widespread from the central to southern Andes in Peru.

Calceolaria annua Edwin, Phytologia 19: 370. 1970.

Annual, branched herb, upper part of the stems pilose with 2-celled, usually gland-tipped hairs, glands minute, becoming glabrous near the base, internodes almost always longer than the leaves; leaves petiolate, very variable, especially as to margins, usually ovate in outline, mostly 1–2 cm. long and 6–9 mm. wide, rarely reaching 3 cm.

long, margins from grossly dentate especially below to occasionally pinnate or almost so above, when pinnate, the pinnae variable in size and outline, tissue usually glabrous above, occasionally pubescent, most often pulverulent beneath, base of the blade only very short decurrent on the densely pubescent, descrete petioles; inflorescences most often 3-flowered cymes, rarely reduced to 1 flower, borne in pairs from the apices of the uppermost leaves or occasionally from the apices of the upper 2–3 pairs of leaves; peduncles up to 3.5 cm. long, pilose as the upper part of the stems; flower size variable; calyx tube pubescent, lobes externally subglabrous, veins parallel, internally glabrous, ovate or elliptical, acute, sometimes 2 different sizes on one flower, 6–8 mm. long and 2–5 mm. wide; corolla yellow, upper lip 2–4 mm. long, sparsely glandular, glands red, sessile, internally glabrous, nectary almost marginal on the sac, 2-parted, very reduced; filaments less than 1 mm. long, anther cell connective shorter than both of the fertile locules the larger of which is about 2 mm. long and the smaller about 1.3–1.4 mm. long; style glabrous, little curved, 1.9–2.4 mm. long; capsule about as long as to little longer than the calyx, glabrous, ovoid, the upper part abruptly narrowed into a short, lanceolate neck, style soon fugacious.

Distributed in Dept. of Lima and possibly one collection from Junin (*Iltis, Iltis, Ugent & Ugent 226, WIS*).

Lima: Río Blanco, between San Mateo and Casapalca, alt. 3,500–3,550 m., *Ferreyra 6974*; Moist rock ledges and granitic soil, S. of Surco, alt. 2,400–3,000 m., *Pennell & Ferreyra 15245* (US); Río Blanco, alt. ca. 15,000 ft., *Macbride 3038*; alt. ca. 12,000 ft., *Macbride & Featherstone 683*; Canta, alt. 2,700–3,200 m., *Pennell 14333*.

The combination of usually dentate leaves and relatively large corolla with copious sac and very reduced nectary distinguishes this taxon from *C. delicatula* Kränzl., to which it is morphologically closely allied.

Calceolaria aperta Edwin, Phytologia 19: 371. 1970.

Shrub to about 1 m. tall, foliage densely lanate or tomentose, stem branched, drying red-brown, appressed-puberulent or -pilose when young, glabrate in age. Leaves narrowly ovate or ovate or oblong-ovate, those of the stem up to 4.2 cm. long and 2.0 mm. wide, usually a little smaller, those of the branches smaller, all leaves densely lanate when young, becoming tomentose with age, margins crenate-dentate or crenulate-denticulate, apices acute, bases broadly

obtuse to (especially the larger) cordate, short-petiolate; petioles lanate; flowers in compound dichasia with long basal peduncles (up to 5.5 cm.) and short pedicels, ca. 0.5–2.0 cm. long, flower-stalks puberulent to tomentose; calyx lobes ovate, ca. 6 mm. long and almost as wide at base, apex obtuse, tomentulose on both surfaces; corolla 13–17 mm. long, essentially glabrous, upper lip erect, up to 5 mm. long, almost as long as the sepals, hooded, lower lip saccate merely along the margin, about 1–3 mm., nectary thin, linear; filaments short, ca. 1 mm. long, thickest at base; anthers large for the corolla, each cell about 2 mm. long and almost as wide medianly, broadly ovoid, papillose-glandular, drying brown with buff-colored lower margins; style thickened, 7–8 mm. long, stigma very thickened and gibbose much larger than the style, ovary short, broadly ovoid, densely beset with sessile glands; capsule unknown.

Known only from the type collection.

Lima: Prov. Canta: near Antaicocha, Cerro Colorado, east of Canta, rocky wall of canyon, alt. 3,600–3,800 m., *Pennell 14642*. A very clearly marked taxon with no morphologically similar species in Peru.

Calceolaria arborescens Edwin, Phytologia 19: 372. 1970.

Erect, much-branched, subglabrous shrub with rigid stems and subcoriaceous, bicolorous, viscid leaves, pubescence restricted to the inflorescences and sometimes the younger wood. Leaves glabrous, ovate to less often elliptical, variable in size from 1–6 cm. long and 0.5–2.5 mm. wide, usually ca. 3–5 cm. and 1–2 cm., entire to serrulate, narrowed to apex and base, often dimidiate, drying dark green above and pale yellow-green beneath, veins faintly visible above, prominent beneath, costa a little elevated, other venation reticulate, petiolate; petioles up to 1.4 cm. long, mostly 5–8 mm. long; inflorescences many-flowered, paniculate dichasia, terminal on the branches; the flower-stalks puberulent or pubescent, basal peduncles up to 4.5 cm. long, terminated by a pair of reduced leaves, decreasing to ultimate pedicels a few mm. long; calyces puberulent-pubescent, unequal in width, ovate to elliptical 6–8 mm. long and 3–5 mm. wide at base, margins minutely ciliolate, apices acute, internally usually glabrous; corolla yellow, 25–27 (–30) mm. long, both lips externally more or less densely beset with minute stalked glands; upper lip hooded, up to about 4 mm. long, lower lip up to 25 mm. long, saccate to three-fifths its length, only little narrowed proximally, glabrous internally or with a tuft of white hairs at base; filaments very short, anther cells

divaricate, slightly to very unequal in size, each pair of cells 5 mm. long, each cell most often at least twice as long as wide, anthers dehiscing through the septum; style 3–4 mm. long, a little curved at apex, stigma punctiform, ovary glandular as the corolla; capsule not known.

Amazonas: Cerro Calla Calla above Leimebamba (19 km.), alt. 3,000 m., *Hutchison & Wright 6916*.—Ancash: Bolognesi, between Tallenga and Pachapaque, alt. 3,500–3,600 m., *Ferreyra 7479*; West slope of Cordillera Negra below Paso de Collán, rocky slopes and banks, alt. 3,650 m., *Pennell 15476*; Moist bank above stream, south slope of Paso de Fortaléza, alt. 3,550 m., *Pennell 15398*.—Junin: alt. 3,500 m., *Ochoa 721*.

Morphologically closest to *C. deflexa* var. *aurantiaca* and also *C. deflexa* var. *typica* differing from both in having the lower lip of the corolla more than twice as long as the upper, in unequal anther cells and in the upper lip of the corolla shorter than the sepals as well as different vesture in the inflorescence. *C. arborescens* differs from the typical *deflexa* also in leaf shape. The superficial resemblance between *arborescens* and *deflexa* var. *aurantiaca* is striking but the taxa differ profoundly on a technical basis.

Calceolaria argentea HBK., Nov. Gen. et Sp. 2: 382, *t. 170*. 1817.

Erect, branched, usually white-lanate shrub, older wood excepted. Stems and branches smooth; leaves oblong or oblong-lanceolate, up to 2 cm. long and 3–4 mm. wide, entire, narrowed to both ends, sparsely lanate above, densely so and obscuring the tissue beneath, short-petiolate; petiole thickened and woody at base; inflorescences at the apex of stem and branches, terminal and axillary, branched dichasia; flower stalks lanate, 1.0–1.5 cm. long; calyx segments ovate, acute, 5–6 mm. long and 4–5 mm. wide at base, internally glabrous; upper lip of the corolla shorter than the sepals, lower lip much larger, up to 2 cm. long, obovoid, minutely puberulent externally, saccate over half of its length, the sac suddenly flaring from near the base; anther cells, equal, divaricate, filaments short. (Ex original description of Kränzlin and type photograph.)

Close to *C. decus-montium* from which it differs in size and shape and internal vesture of the calyx lobes.

Northern Peru in Cajamarca and Paramo de Guamani.

Calceolaria atahualpae Kränzl., Pflanzenr. IV (257C): 107. 1907. *C. excelsior* Kränzl., Bot. Jahrb. 50: Beibl. 111, 74. 1913.

Tall, scandent vine, branches square, diverging, glabrous below and short-dense-tomentose above, internodes varying in length. Leaves elliptical, less often oblong, occasionally ovate or ovate-elliptical, 1–4 cm. long and up to 1.3 (–2.0) cm. wide, vesture very variable, glabrous to minutely pilose above, sparsely to densely tomentose or pilose beneath, crenulate, apically narrowed, basally acute to subobtuse, rarely obtuse, short-petiolate; petiole usually not at all thickened nor woody at base; inflorescences frequently 3-flowered dichasia at the apices of the branches; flowers most often on thin, pilose, up to 4 cm. long stalks or sometimes stalks with a few glandular hairs intermixed; calyx lobes elliptical to ovate, 6–8 (–9) mm. long and 3–4 mm. wide, externally pubescent, internally with a distinct line of very short hairs along the margins, otherwise glabrous to pilose; corollas among the largest in the genus, upper lip longer than the calyx lobes, ca. 1.0–1.2 cm. long, wider than long, lower lip up to 3.2 cm. long and almost as wide, saccate more than half its length with transverse or rectangular orifice, externally glabrous or minutely pilose, internally glabrous to densely pilose, especially at the base of the lower lip; filaments very short, anthers small, each locule ca. 1 mm. long, drying (dark) brown; stigma 2–3 mm. long, ovary glabrous; glutinous; capsule unknown.

Ayachuco: Pampalca between Huanta and Río Apurimac, alt. 3,200 m., *Killip & Smith 23237*; below Tambo and Río Apurimac, alt. 3,500–3,600 m., *Weberbauer 5576*, the type collection of *C. excelsior*; between Tambo and Río Apurimac below Yanamonte, *Weberbauer 5596*; Prov. Abancay, alt. 3,200 m., *Vargas 774*.—Cuzco: Prov. Urubamba, alt. 2,100–2,400 m., *Vargas 797*; alt. 2,800 m., *Vargas 2655*; Prov. Calca, below Lares, alt. 2,800–2,900 m., *Weberbauer 7898*.—Huancavelica: Prov. Tayacaja, Québrada 1 km. N. of Salcabamba, alt. 3,500 m., *Stork & Horton 10333*.—Junin: Carpapata above Huacapistana, alt. 2,700–3,200 m., *Killip & Smith 24377*.

Specimens originally determined as *Calceolaria excelsior* Kr. differ from *C. atahualpae* in a few details, especially as to vesture (as described by Kränzlin) but the differences do not appear to me to be worthy of specific distinction.

Calceolaria aurea Pennell, Proc. Acad. Sci. Phila. 97: 159. 1945.

Shrub with much branched, finely pubescent stem, older wood puberulent. Leaf blades oblong-ovate, 1.0–2.5 cm. long and 8–12

mm. wide, dentate, the 6–8 pairs of teeth rounded, plane, pilose above, veins pilose beneath, intervening tissue reticulate, glabrescent, rounded at both ends; petioles pubescent, 2–5 mm. long; inflorescences of solitary flowers or few-flowered, paired cymes; pedicels finely pubescent, glandless; bracts and bracteoles leaf-like but reduced; sepals ovate, 5–6 mm. long, entire, apically rounded, greenish yellow, pubescent on both surfaces, finely so internally; corolla golden-yellow, externally finely pubescent, upper lip less than 2 mm. long, arching over but not covering the stamens, lower lip 16–22 mm. long, sac shorter than the non-saccate part, internally red-purple blotched and with a tuft of white hairs at base; anthers 3.0–3.5 mm. long, brown, cells cylindric, glabrous, divaricate, about three-fifths as wide as long, dehiscing through the septum; style 2 mm. long, glabrous; capsule 7–9 mm. long, ovoid-conic, densely pubescent, glandless. (Desc. ex Pennell.)

Cuzco: Paucartambo Valley 3,500 m., Jan. 1927, *Herrera 1416*; same data except Jan. 1926, *Herrera s.n.*; Colquipata, rocky banks, alt. 3,200–3,500 m., *Pennell 13772*, Isotype (F; US); Quispicanchis, alt. 3,700–3,900 m., *Vargas 922*; *9816*; alt. 3,500 m., *Vargas 1366*; Prov. Calca, Amaru, Pisac, alt. 3,500 m., *Vargas 5026*; Prov. Canas, Asuncíon Bridge, Apurimac River, alt. 3,760 m., *Vargas 11036*.

Calceolaria ballotifolia Kränzl. in Fedde, Rep. Sp. Nov. 27: 18. 1929.

Tall shrubby climber, stem profusely branching, wood sparsely to densely pubescent, the older sometimes glabrate. Leaf blades ovate, 1.5–6.0(–8.0) cm. long and 0.8–3.5 cm. wide, more or less densely pubescent on both surfaces, especially on the veins beneath, little asymmetrical, coarsely crenate-dentate, apically acute, broadly obtuse and often cordate and dimidiate at base, upper surface usually much darker green than the lower, petiolate, uppermost occasionally subsessile; petioles pubescent, very short to about 1 cm. long, those of the main stem thickened at the base and each pair surrounding the stem as a thin ring; inflorescences terminal or axillary in uppermost leaves, few-flowered, unbranched to twice branched dichasia; flowerstalks pilose; flowers small up to about 16 mm. long; calyx lobes externally pilose, ovate, 6–7 mm. long, acute, margin fimbriate or entire, internally glabrous to pilose; corolla white to pale yellow, upper lip of the corolla well developed, two-thirds to almost as long as the calyx lobes, lower lip ca. 10–12 mm. long, broadly oblong, saccate

about half-way; stamens short, anther cells subparallel to sagittate, each pair joined about half their length apically, usually drying brown, about two-thirds as wide as long, slightly unequal in length and width; style 5–6 mm. long, ovary shining black; capsule conic-ovoid, a little longer than the calyx.

Amazonas: Cerro Puma-urco, southeast of Chachapoyas, alt. 3,400 m., *Pennell 15706*; Chachapoyas, alt. 2,700 m., *Ll. Williams 7575*.—Libertad: Prov. Pataz, *Weberbauer 7036*, Isotype (F).

Calceolaria bartsiaefolia Wedd., Chl. And. Nov. 2: 134. 1860.

Differing from *C. aurea* Pennell in having densely tomentose stems with the vesture black, cinereous near the apex; leaf blade margins grossly and sharply few-dentate, the teeth lightly recurved, glabrous above, canescent-pilose beneath, ovate and oblong, 5–10 mm. long and 3–4 mm. wide; flowers in few-flowered corymbs (usually 3-flowered); pedicels glandular-pilose; calyx segments ovate, acute, 4 mm. long, basally 3 mm. wide.

Reported by Kränzlin from Chicla at 4,300 m., *Ball s.n.* If these obviously closely related taxa were considered conspecific *bartsiaefolia*, the older epithet, would take precedence.

Calceolaria bicrenata R. & P., Fl. Peruv. 1: 15, *t. 23 b.* 1798. *C. bicolor* R. & P., Fl. Peruv. 1: 16, *t. 25b.* 1798. *C. trifida* R. & P., l.c. 17, *t. 26b.* *C. flexuosa* R. & P., l.c. 17, *t. 26a.* *C. saxatilis* HBK., Nov. Gen. et Sp. 2: 382. 1817. *C. lamiifolia* HBK., Nov. Gen. et Sp. 2: 383. 1817. *C. chimborazensis* Willd. ex Link. in Spreng., Jahrb. 1(3): 52. 1820. *C. lancifolia* Willd. ex Link. in Spreng., Jahrb. 1(3): 52. 1820. *C. diffusa* Lindl., Bot. Reg. 16: *t. 1374.* 1830. *C. macrocalyx* Kränzl. in Fedde, Rep. Sp. Nov. 1: 99. 1905.

Shrub or subshrub, occasionally a climber, from densely pubescent to glabrous or almost so, stems and branches erect to semi-prostrate. Leaves all petiolate or the upper sometimes almost sessile, opposite or ternately verticillate above, ovate, sometimes cordate, occasionally oblong, rarely very broadly ovate, 3–10 cm. long and 1–6 cm. wide, mostly 5–8 cm. and 1.5–4.0 cm., acute, occasionally subobtuse, margins usually deeply doubly toothed, the teeth sharp or dull, rarely regularly dentate, base when not cordate, obtuse, tissue chartaceous to firm and thickened; inflorescences few- to many-flowered, dichasiate, corymbose or paniculate, terminal or in upper leaf-axles of the branches; interfloral leaves reduced; flower-stalks decreasing base to apex; flowers large for the genus; calyx lobes

ovate, 5–10 mm. long, mostly 6–9 mm., light yellow-green to dark brown-green, acute, entire or few-toothed, sometimes reflexed after anthesis, rarely 2 sizes on one flower; corolla yellow and white or all yellow, often red-glandular-dotted and pustulate externally, upper lip of the corolla minute, ca. 1 mm. long to about half as long as the sepals, rarely to two-thirds as long, usually arched over the genitalia, lower lip 15–30 mm. long, saccate about half way or less, sac sometimes furrowed, erect, ascending or patent, up to about two-thirds as wide as long, usually half as wide, internally with a tuft of multicellular, white hairs at base; stamens usually short, shorter than the style, anther cells at least 2 times longer than wide, divergent or divaricate, distally downturned or plane, sometimes when divergent, proximally joined apically and appearing subsagittate; style 1.5–2.5(–3.3) mm. long or rarely 4–5 mm. long; ovary usually glandular, glands red; capsule ovoid-conic, usually glandular and a little longer than the calyx, frequently blunt at apex.

Generally distributed in the Andes from Cajamarca in the north to Arequipa in the south. Citations are selected from the quite copious material.

Ancash: Prov. Bolognesi, Arriba de Rasrachaca, alt. 3,300–3,400 m., *Ferreyra 9508*.—Arequipa: Condesuyas, Chuquibamba, alt. 10,000 ft., *Stafford 1158*.—Ayacucho: Pampalca between Huanta and Río Apurimac, alt. 3,200 m., *Killip & Smith 22251*; north of Huanta, near Huaillay, alt. 3,500–3,600 m., *Weberbauer 7590*.—Cajamarca: Cajabamba, *Carricker s.n.*; *Osgood & Anderson 55*; Along streams on jalca, Cord. de Cumulloa to Celendin, alt. 3,300 m., *Pennell 15169*; Along stream E. of Cajamarca, alt. 2,600–2,700 m., *Pennell 15226*.—Huancavelica: Larmes al E. of Conaica, alt. 3,400–3,450 m., *Tovar 174*; Salcabamba, Prov. Tayacaja, shrubland, alt. 3,250 m., *Stork & Horton 10275*; Prov. Huancavelica, 4 km. south of Mejorada, alt. 2,500 m., *Stork & Horton 10919*.—Huanuco: Huacachi station near Muña, alt. ca. 6,500 ft., *Macbride 3883*.—Junin: Between Viques and Ingahuasi, Mantaro Canyon, S. of Huancayo, alt. 3,150 m., *Killip & Smith 22144*; Tarma, along stream, alt. 13,000 ft., *Macbride & Featherstone 1071*; Pueblo Chinchapalca, 5 miles above Mito, alt. ca. 9,500 ft., *Macbride & Featherstone 1588*.—Libertad: Prov. Otuzco, Agallpampa, alt. 3,200 m., *Lopez 0307*; Dry bank, above Motil, alt. 3,000 m., *Pennell & Ferreyra 14840*.—Lima: Along Río Chillon near Obrajillo, bushy banks, alt. 2,200–2,500 m., *Pennell 14328*; Canta, rocky slopes and along irrigation ditch, alt. 2,700–2,900 m., *Pennell 14353*;

San Buenaventura, open rocky bank, alt. 2,800–2,900 m., *Pennell 14543*; Moist thicket, hills south of Surco, alt. 2,000–3,000 m., *Pennell & Ferreyra 15251*; Canta, *Ruiz & Pavon s.n.*; Prov. Cajatambo, Baños de Churin, alt. 8,000 ft., *Sandeman 5388*.—Pasco: Vicinity of Cerro de Pasco, ledge of limestone cliff, alt. ca. 12,500 ft., *Jenks 40*; Yarush, alturas de Huariaca, alt. 4,000 m., *Ochoa 1116*.—Sin. Loc.: *Dombey s.n.*; *Mathews 1681*.

Calceolaria boliviana (Britton ex Rusby) Pennell, Proc. Acad. Nat. Sci. Phila. 97: 170. 1945.

Perennial herb or climbing shrub, young wood 4-angled and puberulent, older glabrate, often with peeling bark. Leaf blades lanceolate to usually lance-ovate or ovate, 1.5–6.0 (–7.0) cm. long and 0.5–3.0(–3.5) cm. wide, crenate or crenate-dentate, long-acute or acute apically, usually subobtuse or obtusely rounded basally, usually puberulent on both surfaces, sometimes only pilose on veins beneath, most often red-punctate on both surfaces; petioles 0.4–1.2 cm. long, usually thickened and pubescent and narrowly connate across the node, not at all woody; inflorescences terminal, dichasiate or corymbose, not exceeding 10-flowered, usually less; pedicels and peduncles pubescent or puberulent, peduncles 2–8 cm. long, pedicels decreasing base to apex, the ultimate pedicels smallest; bracts and bracteoles reduced, lanceolate, crenate or crenulate; flowers very variable in size; calyx lobes often reflexed in anthesis, 6–9 mm. long, and 5–6 mm. wide at base, ovate, obtuse or acute, entire or few-dentate; corolla yellow or orange, drying orange, usually large for the genus, 20–35(–37) mm. long and about half as wide distally, most often externally puberulent and internally with a tuft of white hairs at the base of the lips; upper lip longer than the sepals, up to 1.2 cm. long, usually erect, lower lip 20–28 mm. long, saccate over half its length; stamens small, anthers divergent or almost parallel, only little longer than wide, reniform or ovoid, or as wide as long and almost spherical, brown in life and when dry; ovary red-glandular or pubescent, style 6–8 mm. long; capsule about as long as wide at base and about equal to the calyx in length, glabrous, glandular or pubescent.

Two varieties both from southern Peru (Cuzco and Puno) are easily separable.

Leaves mostly 3.5 cm. long or longer, crenate; ovary and capsule glandular or glabrous . . . . . *C. boliviana* var. *boliviana*.

Leaves all or mostly shorter than 3.5 cm., dentate; ovary and capsule pubescent.....*C. boliviana* var. *speciosa.*

Calceolaria boliviana (Britton ex Rusby) Pennell var. *boliviana. Fagelia boiiviana* Britton ex Rusby, in Bull. Torr. Bot. Club 27: 24. 1900. *Calceolaria zanatilla* Kränzl. in Fedde, Rep. Sp. Nov. 1: 107. 1905.

Cuzco: Prov. Quispicanchis: Near Marcapata, alt. ca. 3,000 m., *Metcalf 30733*; Near Río Yanamayo, below Pillahuata, alt. 2,100–2,300 m., *Pennell 13934*; Between Mistiana and Kerous, Valle Cosñipata, near Paucartambo, alt. 600–950 m., *Scolnik 888*; Prov. Paucartambo, between Tanamayo and Tambamayo, alt. 1,500–2,200 m., *Vargas 67*; Prov. Calca, near Vilcabamba, alt. 2,800 m., *Vargas 3937*; Paucartambo, Río Tambomayo, *West 7095* (cult. at U. Calif.).—Puno: Prov. Sandia, near Limbani, alt. 3,200–3,450 m., *Metcaif 30530.*

Calceolaria boliviana var. **speciosa** (Pennell) Edwin, stat. nov. *C. speciosa* Pennell, Proc. Acad. Nat. Sci. Phila. 97: 167. 1945.

Cuzco: Prov. Paucartambo, alt. 12,000–13,000 ft., *Balls 6701*; *6776*; Paucartambo to Trés Cruces, Cerro de Cusilloyoc, alt. 3,400–3,500 m., *Pennell 13813*; Alt. 3,400–3,600 m., *Pennell 13816*, type collection of *C. speciosa*; Alt. 3,700 m., *Vargas 1547*; Between Acjamacu and Trés Cruces, alt. 3,500–3,700 m., *Vargas 2249*; Prov. Urubamba, Puyupatamarca, alt. 3,400 m., *Vargas 2779a*; Prov. Paucartambo, Dist. Marcachea, vicinity of Marcachea, alt. 3,400–3,500 m., *Vargas 1175.*

Calceolaria brachyantha Edwin, Phytologia 19: 373. 1970.

Glandular, erect shrub, much branched with ascending branches. Leaves minute to very small, sometimes with abbreviated shoots in the axils, the leaves then appearing clustered, linear or occasionally lanceolate-linear or aciculiform, mostly 1–3 mm. wide but infrequently up to 6–7 mm. and up to about 1.2 cm. long, mostly shorter, margin entire or with 2–3 pairs of teeth near the apex, usually revolute, apically acute, either sessile or short-petiolate, when present the minute petiole thickened and the leaf-base short-sagittate, blades glandular-puberulent or -pubescent on both surfaces, especially on the costa beneath, main vein impressed above, elevated beneath, other venation obsolete, tissue dark green above, pale green beneath, coriaceous and usually thickened; inflorescences terminal on the

branches, few- to about 15-flowered, in regularly or irregularly branching dichasia; peduncles and pedicels glandular and erect, peduncles usually 2–3 times longer than the pedicels; flowers very variable in size; sepals lance-ovate to ovate on the same flower, usually about 4 mm. long and 3 mm. wide at base or 5 mm. long and 2 mm. wide at base (those of the smallest flowered collections about two-thirds the others), acute, glandular-puberulent on both surfaces; corolla yellow, 13–26 mm. long, externally glabrous or the upper lip puberulent; upper lip about a half to two-thirds the length of the sepals, covering the stamens, lower lip oblong, saccate about three-fourths to four-fifths its length, internally glabrous; stamens with very short (subobsolete) filaments, anthers among the smallest in the genus, cells a little unequal or almost equal, divaricate, each pair ca. 2.5–3.0 mm. long and about one-third to a half as wide; style thickened, ca. 2.0–2.5 mm. long, about the size of the densely glandular ovary; capsule glandular, exceeding the calyx, 5–7(–8) mm. long, and 2–3 mm. wide at base, ovoid-conic, long-acute, style persistent.

Distributed in the Andes from north central to northern Peru, departments Ancash, Libertad and Cajamarca.

Ancash: Shincush above Chiquián in Prov. Bolognesi, alt. 3,980 m., *Ferreyra 5820*.—Cajamarca: Between Cajabamba and Huamachuco, Prov. Cajabamba, alt. 3,000–3,200 m., *Ferreyra 3053*; Cumbre above Cajamarca, alt. 3,500 m., *Olsson 2*; Cajamarca: Culentin (prob. Celendin) Road, km. 15.5, *Olsson s.n.*, Feb. 11, 1948; Cajamarca: Rocky limestone, alt. 2,750–2,850 m., ridge, 11 km. S. of Cajamarca, *Pennell & Anderson 15076*; Rocky limestone, alt. 2,750–2,850 m., ridge 11 km. S. of Cajamarca, *Pennell & Anderson 15077*; Baños del Ynca, just outside Cajamarca, *Soukup 4627* and *4630*.—Libertad: Toyabamba, in timber-line scrub, alt. 11,000 ft., *Carricker s.n.*; Otuzco, *Ferreyra 3043*; Above Huamacucho, alt. 3,400 m., *Pennell & Ferreyra 14872*.

This species is close to *Calceolaria linearis* R. & P., *C. cajabambae* Kr., *C. ludens* Kr., and *C. engleriana* Kr., differing from these by various character combinations, especially anther size, calyx lobe shape, and vesture and leaf blade shape and size.

Calceolaria cajabambae Kränzl. in Fedde., Rep. Sp. Nov. 1: 102. 1905.

Shrub with branched stems, wood pilose, sometimes drying black or black-dotted. Leaves numerous, small, mostly oblanceolate or

lanceolate, up to 2–3 mm. wide often less and up to 1–2 cm. long, margin revolute, entire or with small rounded-obtuse teeth, especially on upper half, acute at both ends, sometimes long-acute to base, coriaceous, pilose above and below, tissue clearly visible especially when mature; the pubescence of wood and foliage erect or almost so and short; inflorescences terminal or in upper leaf-axils, 2–3-flowered or flowers solitary; pedicels 2–3 cm. long, pilose or villous; bracts merely reduced leaves; flowers 20–25 mm. long; calyx densely pilose externally, pubescent internally, lobes broadly ovate, ca. 7 mm. long and 5 mm. wide at base, acute; upper lip of the yellow corolla a little shorter than the calyx, ca. 4–6 mm. long, lower lip obovate-orbicular, 16–19 mm. long, saccate less than half its length, sac erect, entire corolla densely to sparsely pilosulous externally, the throat (ex desc.) pulvinate-papillose or glabrous; stamens on short filaments; anther cells 2 or more times longer than wide, unequal, divaricate, each pair of cells ca. 5 mm. long, septum thickened; style 3.0–3.5 mm. long; ovary glutinous, sometimes also glandular, capsule not seen.

Sin. Dept.: Steep grassy slope, alt. about 12,000 ft. Río Blanco, *Macbride & Featherstone 662.*

Close to *C. reichlinii* and *C. brachyantha* Edwin and *C. linearis* R. & P. The type from Dept. Ancash; photograph seen.

Calceolaria callunoides Kränzl. in Fedde, Rep. Sp. Nov. 1: 103. 1905.

Erect, branched shrub, wood glabrous below, white or dark pilose or puberulent above. Leaves very numerous, aciculiform or linear, less than 1 cm. long and 1 mm. wide, margin revolute, apex hammate or plane, slightly wider at base, puberulent beneath, sessile; inflorescences of crowded flowers at the apex of stems and branches or axillary, irregularly dichasiate, spicate occasionally (ex. desc.) corymbose; pedicels and peduncles puberulent; flowers small, ca. 10 mm. long; calyces puberulent, 2–3(–4) mm. long, narrowly to broadly ovate, acute or obtuse; upper lip of the corolla longer than the calyx; lower lip ca. 7 mm. long, saccate about half way, narrowly obovate; stamens on short filaments, anthers about as wide as long to 1.5 times longer than wide, globose or subglobose, cells equal; style long for the corolla, ca. 2.5–3.5 mm. long, exserted; capsule shorter than to equaling the calyx, globose to broadly ovoid, glabrous or pubescent.

Amazonas: Grassy open, Cerro Puma-urcu, alt. 3,250–3,400 m., *Pennell 15688*.—Libertad: Stony soil, above Motil, alt. 3,200 m., *Pennell & Ferreyra 14882*.

This species and *C. alternifolia* Cav., *C. brachyantha* Edwin, and *C. hypericifolia* Edwin form a close complex.

Calceolaria calycina Benth. in DC., Prodr. 10: 211. 1846. *C. kraenzlinii* Kränzl. in Engl., Bot. Jahrb. 54: Beibl. 119, 19. 1916.

Tall, erect, usually glutinous-hispid, perennial herbs. Leaves, except the upper, bizarre; petioles broadly winged, connate-perfoliate, usually shorter than the blades, varying from narrower than to almost as wide as the blades, widest at the stem, entire or with a few small, rounded teeth; blades deltoid-triangular to broadly ovate, very variable in size, up to over 10 cm. long, irregularly doubly crenate, acutish at apex, rugose-hispid above, usually canescent beneath; flowers forming large, ebracteolate panicles, often big for the genus, the yellow calyx lobes reaching 30 mm. long and the bright yellow corolla up to 55 mm. long; calyx lobes broadly ovate, most often long-acuminate, occasionally acute, mostly 17–25 mm. long; upper lip of the corolla a little shorter than the calyx lobes, lower lip little less than to more than twice as long as the upper, orifice usually less than half the length of the sac; filaments thickened, shorter than the 5–7 mm. long, apically sigmoid style, anthers divaricate, thecae 1.3 to 1.8 times longer than wide; ovary densely beset with long, tangled hair; capsule much smaller than the loosely enclosing calyx lobes, almost spherical to very broadly ovoid, densely pubescent.

Amazonas: Cerro Puma-urcu Southeast of Chachapoyas, alt. 2,800–3,200 m., *Pennell 15535*; Alt. 2,900–3,500 m., *Wurdock 788*.—Junin: Carpapata above Huacapistana, edge of forest, alt. 2,700–3,200 m., *Killip & Smith 24433*.—Libertad: Prov. Otuzco, El Granero (Hda. Llaguen), alt. 2,900 m., *Lopez 599*.

Calceolaria cerasifolia Benth. in DC., Prodr. 10: 218. 1846.

Erect, branched, glutinous, often viscose shrub, branches frequently 4-angled, especially above, young wood sometimes sparsely brown-pilose, more often glabrous, tufts of white or brown hairs frequently present at the younger nodes. Leaves petiolate, mostly lance-ovate, occasionally lanceolate or broadly ovate, 2–3 cm. long and 1 cm. wide or up to 10–12 cm. long and 4 cm. wide, serrulate to serrate, glabrous, subcoriaceous, acute at the apex, obtuse at base, dark brown-green above, much paler beneath; petioles 1–2 cm. long;

inflorescences paniculate or corymbose, ultimate pedicels ca. 1 cm. long, shining; bracts and bracteoles minute; calyx lobes ovate, 5–7 mm. long, acute, externally glabrous, internally with a distinct row of oriented hairs along the margins, otherwise glabrous or puberulent; corolla yellow, upper lip longer than the calyx, lower lip usually less than twice the length of the upper lip, occasionally reaching twice as long, saccate about half way, entire corolla up to 22 mm. long, sometimes externally puberulent, usually with a tuft of hairs internally at the base; stamens short, anther cells equal, divaricate, a little longer than wide, dehiscing through the septum; style thin, ca. 1.5–2.5 mm. long; ovary and capsule usually glabrous, sometimes both puberulent, capsule broadly ovoid, acute, most often a little shorter than the calyx.

Amazonas: N. of Chachapoyas, along stream, alt. 2,350–2,400 m., *Pennell 15501*; Southeast of Chachapoyas, Cerro Puma-urcu, alt. 2,400–2,900 m., *Pennell 15503*; alt. 3,000–3,200 m., *Pennell 15548*; Ridge, SE. of Calcomar, alt. 2,100–2,200 m., *Pennell 15596*; Banks, alt. 2,100 m.; *Pennell 15599*; roadsides, alt. 2,400 m., *Pennell 15605*; Rocky, mountain slopes, alt. 2,700–2,800 m., above Calcomar, *Pennell 15614*; Thickets on mountains, alt. 3,200–3,300 m., *Pennell 15628*; Grassy jalca, alt. 3,500 m., *Pennell 15651*; On rocks, Cerro Puma-urcu, alt. 3,400 m., *Pennell 15713*; Lower slopes of Puma-urcu, abundant, 2,400–2,500 m. alt., *Wurdack 429*.—Anchash: Yánar, weed in cult. field and on roadsides, etc., *Carricker s.n.*; Bushy banks, N. of Chancos, alt. 3,250 m., *Pennell 15326*; Bushy bank, mountain, E. of Copa Grande, N. of Chancos, alt. 3,300–3,500 m., *Pennell 15366*; Ravine on jalca, alt. 3,500–3,550 m., Cerro San Christobal, N. of Huaraz, *Pennell 15453*; Puerto Domingo, alt. 4,200 m., *Rauh-Hirsch P2047*.—Cajamarca: Vicinity of Cajamarca, alt. 2,800–2,850 m., *Ferreyra 3271*; Along stream, E. of Cordillera de Cumulloa, alt. 3,400 m., *Pennell 15163*; Mountain E. of Celendin, alt. 2,700–2,900 m., *Pennell 15192*; *15208*; Hills midway between Cerro de Cumulloa and Celendin, alt. 2,700–3,000 m., *Pennell 15222*; Below spring, Paso de Gavilán, alt. 3,200 m., S. of Cajamarca, *Pennell & Anderson 15089*; 2,850 m. alt., *Pennell & Anderson 15299*; 3,000–3,300 m. alt., *Pennell & Ferreyra 14945*; Prov. Contumaza, Juqué, Trinidad, alt. 3,230 m., *Sagastegui 3841*; Roadside, Hualgayoc to Bombamarca, alt. 2,650 to 2,625 m., *Scolnik 1350*; Prov. Chota, Huambos, alt. ca. 2,000 m., *Soukup 4558*.—Libertad: Prov. Otuzco, between Motil and Shorey, km. 105, alt. 3,500 m., *Lopez 1131*; *2367*;

Yanac, ca. 15 km. SE. of Huamacucho, alt. 3,080 m., *Straw 2510.*—Piura: El Tambo, alt. 9,300 ft., *Carricker s.n.*; Banks at edge of forest, alt. 1,700–1,900 m., above Chanqui, *Pennell & Ferreyra 14914*; Ayabaca, alt. 2,743 m., *Soukup 4353*; no location in Piura, *Weberbauer 6039.*

Calceolaria chaetostemon Pennell, Proc. Acad. Nat. Sci. Phila. 97: 171, *f. 15a.* 1945.

Herbaceous, probably perennial, 3 dm. tall or taller, stem hirsute, internodes longer than the leaves. Leaves petiolate, ovate, mostly 5–9 cm. long and 3.5–8.0 cm. wide, pubescent on both surfaces, margins dentate, usually acute at apex, base subtruncate-obtuse to cordate; petioles about 1 cm. long, lax-pubescent; inflorescences typically a pair of twice branched, ebracteate cymes, sometimes one cyme suppressed; flower stalks minutely glandular, multicellular-pubescent, the glands apically placed, minute; basal peduncle 6–9 cm. long or longer; secondary and ultimate stalks (pedicels) abruptly much shorter; calyx lobes lance-ovate, 2–3 mm. long, subobtuse, externally hirsute, hairs gland-tipped, multicellular, internally glabrous; corolla yellow, upper lip ca. 3 mm. long, externally pubescent as the sepals, lower lip 7–9 mm. long, saccate more than half its length, lobes crenate, nectary downturned, narrowed, pubescent with minute gland-tipped hairs; lower anther cell subobsolete or lacking, connective as long as or longer than the upper cell, thickened and auriculate above the insertion of the filament; style 2.0–2.5 mm. long, strongly curving inward, basally puberulent; the young capsule glandular-pubescent.

Apurimac: Abancay Prov., Curahuasi, alt. 2,800 m., *Marin 1953.*—Cuzco: Anta, alt. 2,700 m., *Vargas 231* (type F); Ayusbamba, alt. 3,000 m., *Vargas 852*; Limatambo, alt. 3,400 m., *Vargas 7079.*—Huanco: Hills N. of Acomayo, alt. 2,400 m., *Woytkowski 257.*

Calceolaria chrysocalyx Pennell, Proc. Acad. Nat. Sci. Phila. 97: 166. 1945.

Perennial herb, erect and glandless, stems branched, distally pilose and becoming glabrous and subshining, internodes longer than the leaves, drying light brown. Leaves ovate, 4–10 cm. long and 3–8 cm. wide, dentate, teeth rounded, apically acute, basally rounded-truncate to slightly cordate, dark green and pilose above, tomentose beneath, rarely tomentum wanting; petioles 5 mm. long, pilose or glabrate, tumid, woody at base and narrowly connate at the node; inflorescences in terminal groups of 2 pairs of 3-compound cymes;

basal peduncles 7–15 cm. long, flower-stalks decreasing apically to 1 cm. long, hirsute; primary bractlets ovate-lanceolate, dentate, acuminate, mostly 2–5 cm. long; sepals ovate, 11–15 mm. long, acute, reticulate veined, externally pilose, bright yellow; corolla yellow, upper lip ca. 5–6 mm. long, minutely pilose externally, lower lip 18–23 mm. long, sac globular, less than half the length of the lip, glabrous internally and externally; anther cells equal, gray-brown, dehiscing through the septum, subparallel to somewhat divergent, ca. 1.5 times longer than wide; style ca. 2.0–2.5 mm. long, little if at all thickened; capsule ovoid-conic, 5–8 mm. long, pilose, hair short, spreading.

Apurimac: Prov. Abancay, Ampai, alt. 3,000 m., *Vargas 775*; Prov. Grau, Heights of Oropega Valley, alt. 3,400–3,800 m., *Vargas 9810*.—Cuzco: Paucartambo, 11,500 ft., *Balls 6724*; Prov. Urubamba, Cerro Machu-picchu, alt. 3,200 m., *Mexia 8077*; Near Río Yanamayo, below Pillahuata, alt. 2,900–3,200 m., *Pennell 13792*, type coll; Macchu-picchu, near Puno, alt. 4,000 m., *Soukup 144*; Prov. Convencíon, Macchu-picchu, alt. 2,400 m., *Vargas 797*; Prov. Paramo, near Hda. Ayusbamba, alt. 3,300–3,860 m., *Vargas 857*; Macchu-picchu, alt. 2,100 m., *Vargas 2090*; Prov. Calca, below Lares, alt. 2,900–3,000 m., *Weberbauer 7899*; Cultivated in U. of Calif. Bot. Gard. from a collection from Macchu-picchu, alt. 2,400 m., *West 6428*.—Sin. Dept.: Valle de San Miguel, alt. 2,060–2,260 m., *Herrera 1998*.

This species is close to *C. bicrenata* R. & P. which differs in having smaller calyces, light yellow-green or darker glandular-pubescent flower stalks and in deeper doubly-toothed leaf-margins.

Calceolaria chrysosphaera Pennell, Proc. Acad. Nat. Sci. Phila. 97: 156. 1945.

Perennial herb, hirtous-pubescent with spreading, short, brown, glandless hairs, densest on young growth, stems branched, pilose beneath the new growth. Leaves lanceolate, the larger 6–11 cm. long and 1.0–2.5 cm. wide, sometimes shorter and less than 1.0 cm. wide, obscurely crenate-dentate to subentire, pilose and dark green above, paler and pubescent on the veins beneath, cuneate at base; petiole less than 1 cm. long, narrowly connate at the node, little if at all thickened or woody; inflorescences few-flowered; basal peduncles 8–9 cm. long; pedicels ca. 2 cm. long; primary bracts lanceolate, as long as or longer than the pedicels; sepals ovate, acuminate, 10–12 mm.

long, few-dentate, finely pubescent; corolla yellow, externally glabrous, upper lip ca. 2 mm. long, lower lip ca. 15 mm. long, hirsute within at the base, sac globose, ca. half the length of the lip; anther cells equal, each pair ca. 3 mm. long and two-thirds as wide, divaricate, dehiscing through the septum; style 2 mm. long; capsule and ovary (immature) globose, glandular-pilose. Hair sometimes septate on new wood.

Cuzco: Upper valley of Río Sembray, W. affluent of Vilcamota, alt. ca. 1,700 m., *Mexia 8058*; near Río Yanamayo, below "Pillahuata," bank in forest, alt. 2,000–2,300 m., *Pennell 14045*, type collection.

Calceolaria colcamarensis Edwin, Phytologia 19: 374. 1970.

Erect, appressed-pubescent herb, stems simple or few-branched, branches, when present, frequently abbreviated in leaf-axils, nodes mostly much longer than the leaves, pubescence soft, white or light-gray, densest on younger growth. Leaves short-petiolate, ovate or less often narrowly ovate, all but the largest at least twice as long as wide, (1.5–)2.0–4.8 cm. long and 0.6–2.0(–3.0) cm. wide, margins serrate-serrulate, apex broadly acute, base cuneate, densely appressed-short-pubescent and red-punctate above, appressed-pubescent on the elevated, almost white, thickened veins and densely red-punctate beneath; petioles 2–10 mm. long, sparsely to densely pubescent, thickened, discrete; inflorescences terminal or in upper axils, dichasiate-corymbose, few- (ca. 3–5-) to many-flowered (ca. 15–20); basal peduncles up to 3 cm. long, flower-stalks decreasing to ultimate pedicels a few mm. long, all stalks densely appressed-pubescent; calyx lobes when young with pubescence and venation as the lower surface of the leaves, veins with age less apparent and vesture less dense, mostly ovate, acute, 7–10 mm. long, internally glabrous; corolla yellow, wholly glabrous, 13–17 mm. long; upper lip 2–4 mm. long; lower lip distally almost round, saccate less than halfway, orifice oblique; stamens small, filaments short, anther cells equal, divaricate, a little less to a little more than twice as long as wide, each cell ca. 1.2–1.4 mm. long, red-brown when dry; style 1.5–2.0 mm. long, glabrous, ovary resinous, dark red gland-dotted; capsule broadly ovoid, abruptly long-acute, 5–6 mm. long and wide, red-gland-dotted.

Amazonas: Roadsides on dry loam, alt. 2,300–2,800 m., Colcamar, *Pennell 15604*.

This species differs from all other Calceolarias by the combination of the following characters: flattened, elevated, white venation on the leaf blades beneath, dense-red-gland-dotted fruit, calyx and blade, sepals often about half as long as the lower lip of the corolla and appressed pubescence on the stems and branches.

Calceolaria collanensis Edwin, Phytologia 19: 375. 1970.

Erect, much-branched shrub, the wood when young densely white-puberulent-pubescent, becoming glabrous with age, branches and branchlets twisted, drying brown to dark brown or black, internodes much longer than the leaves, sometimes 5–7 times as long. Leaves petiolate, ovate to very broadly ovate, 0.6–1.5 cm. long and 4–10 mm. wide, margins narrowly revolute, thickened, with 3–7 pairs of obtuse lobes or teeth, pubescent-puberulent on both surfaces, hairs curly beneath, apically acutish, basally broadly obtuse to subtruncate; petioles short, up to 5 mm. long, pubescent-puberulent, thickened, swollen and woody at base, the petioles of the main stems and branches with abbreviated branchlets in the axils; inflorescences simple or branched dichasia, borne in upper leaf-axils on stems and branches, occasionally the dichasium suppressed and axils 1-flowered; flower-stalks short, pubescent-puberulent; bractlets when present, minute; calyx lobes elliptically ovate or elliptical, 5–6 mm. long and 1.5–2.5 mm. wide, pubescent on both surfaces; corolla 11–12 mm. long, drying dark brown (orange-red in life?), lower lip ca. 2 mm. long, upper lip saccate distally only 1–2 mm., sac undulate, nectary only partly reflexed-hidden, almost as long as the sac, entire lip glabrous or sparsely papillose-puberulent; filaments 1.0–1.5 mm. long, anther cells equal, divaricate, little longer than wide; style ca. 1.0–1.5 mm. long, ovary red-shining-glandular; capsule exceeding the calyx, 7–8 mm. longer, narrowly ovate to ovate, upper half narrowly elongate, beaklike, red-shining-glandular, glands short-stalked.

Known only from the holotype.

Ancash: Western slope of Cordillera Negra, below Paso de Collán, bank along stream, alt. 3,500 m., *Pennell 15470*.

This taxon is quite distinct from all other taxa due to the combination of open corolla with undulate sac and prominent nectary as well as the swollen petioles with abbreviated axillary shoots and finally the long internodes.

Calceolaria connatifolia Pennell, Not. Nat. 256. 1951.

Lax scrambling herb up to 1 m. tall, glabrous or subglabrous except for the inflorescence. Stems drying purple or brown; leaves connate-perfoliate, tapering to apices, oblong-lanceolate, 5–8 cm. long and 2.0–3.5 cm. wide, serrate, dark green above, pubescent on the sunken mid-vein, paler beneath with sharply marked reticulations; flowers in simple or compound cymes, in axils of upper leaves; stalks of the inflorescences short-pilose to subglabrous; basal peduncles up to 4.0 cm. long, the intermediate peduncles shorter; the pedicels shortest, 1.5–2.0 cm. long; sepals 4–5 mm. long, broadly ovate, mucronulate, glutinous and sometimes externally pilose, internally with a dense row of short hairs near the margin; corolla lemon-yellow, globose, upper lip 2–3 mm. long, projecting over the anthers, lower lip up to 8–9 mm. long, saccate about one-third its length, basally hirsute within; anthers pale brown, cells rounded, dehiscing through the septum; style much exceeding the stamens, ca. 4.0 mm. long, sigmoid at apex, ovary glabrous, glutinous; capsules very broadly ovoid or deltoid-ovoid, narrowed to apex, subglutinous, much smaller and included in the loosely investing sepals.

Amazonas: Cerro Puma-urco, near summit, seepage forest, in thicket, alt. 3,300–3,400 m., *Pennell 15906*; alt. 2,700–3,100 m., *Wurdack 1631*.—Cajamarca: *Carricker s.n.*

Calceolaria cordiformis Edwin, Phytologia 19: 376. 1970.

Climbing perennial herb or subshrub, stem branched, when young densely tomentose-lanate, becoming almost glabrous with age, nodes longer or shorter than the leaf blades. Leaves opposite or verticillate, broadly ovate-cordiform, mostly up to 1.5 cm. long, rarely up to 2.5 cm. and up to 9 mm. wide, occasionally up to 2 cm. wide, tomentose above, very densely tomentose-lanate beneath, the pubescence completely obscuring the tissue, margins revolute, dentate, teeth large, round, apex subacute or acute, bases cordate, occasionally truncate or broadly obtuse, venation impressed above, sessile or subsessile; petioles when present up to 4 mm. long, very densely lanate; inflorescences dichasiate, dense, terminal or in upper leaf-axils; flower-stalks not exceeding 2 cm. long, often less than 1 cm. long, densely lanate; calyx externally lanate, internally glabrous or sparsely puberulent at the apex, especially when young, ovate, ca. 5 mm. long and 4 mm. wide near the base, entire, acute; corolla yellow, wholly glabrous, 7–9 mm. long, lower lip 1–2 cm. long, upper lip saccate less than half its length, ca. 3–4 mm. wide; anther cells

equal, each pair divaricate, ca. 1.5–2.2 mm. long, about twice as long as wide, filaments ca. 2 mm. long; ovary glandular, style short, ca. 1–2 mm. long; capsule glandular, ovoid-conic, acute, shorter than and loosely invested by the calyx lobes.

This taxon is keyed as leaves more or less than 1 cm. wide, since the largest leaves indicate the strong possibility that future collections may well have all or most leaf blades wider than 1 cm.

Cajamarca: Along streamlet, above Llama, alt. 2,450 m., *Pennell 15924*; Prov. Chota, Huambos, alt. ca. 2,000 m., *Soukup 4549*.—Piura: Road from Huancabamba to the three acequias, alt. ca. 2,500 m., *Scolnik 1422*.

This taxon is closest to *C. hedera*, *C. aperta*, and *C. velutinoides* Edwin, but quite readily separable from these taxa.

Calceolaria corymbosa R. & P., Fl. Peruv. 1: 14, *t. 20b*. 1798.

Herb, nodding and scapose to erect and caulescent, the stems pubescent, usually unbranched and few-leaved, up to 60 cm. tall, foliage and inflorescences usually variously pubescent; internodes gibbose or not. Leaves mostly radicle, long- to short-petiolate, the stem leaves when present petiolate to sessile or almost so, ovate to elliptically ovate, 4–15 cm. long and 2–8 cm. wide, usually irregularly crenate to obtusely dentate, rarely teeth reduced, apex obtuse, base sometimes attenuate to acute, usually obtuse, subglabrous to densely pubescent; inflorescences usually few-flowered, regularly, bifurcately branching or corymbose, either terminating a scape or in axils of upper leaves; uppermost leaves bracteate; bracteoles lacking; flower-stalks usually pubescent, from much longer to shorter than the flowers, the pedicels shortest; calyx lobes deltoid-ovate or broadly ovate, acute or short-acuminate, usually densely pubescent and soft-ciliate, pubescence occasionally sparse, dark red-green externally, light yelow-green internally, 7–9 mm. long; calyx tube 1–2 mm. long, pubescent; corolla 10–18(–22) mm. long, lemon-yellow, marked with brown lines, glabrous or sometimes viscid-puberuelnt, upper lip much shorter than the calyx lobes, with a tuft of long, white pubescence internally at base, lower lip 4 to 5 times longer than the upper, about two-thirds as wide as long, distally strongly upcurved, the upper fold one-half to almost completely closing the orifice; filaments short, dilated, anthers divaricate, about twice as long as wide; style usually shorter but varying to longer than the filaments, ovary glabrous or glandular-pubescent.

The northern collections usually more densely pubescent than the southern. The species as now constituted shows a disjunct distribution.

Plants scapose.....*C. corymbosa* var. *corymbosa.*
Plants caulescent.....*C. corymbosa* var. *perennis.*

Calceolaria corymbosa R. & P. var. **corymbosa** 19: 377. 1970.

C. paralia Hook., Exot. Fl. *t. 75.* 1823, non Cav. *C. hians* Penny ex Don and *C. hopeana* Morris ex Don, Gen. Syst. 4: 603 and 606. 1838. *C. elliptica* Wedd., Chl. And. Nov. 2: 137. 1860. *C. heterophylloides* Kränzl. in Fedde, Rep. Sp. Nov. 1: 100. 1905.

Cajamarca: East of Celendin, alt. 2,700–2,900 m., *Pennell 15209*; Paso de Gavilán South of Cajamarca, alt. 3,200 m., *Pennell & Anderson 15094* and *Pennell & Ferreyra 14954*; Michiquillo, alt. 3,400–3,500 m., *Pennell & Reichlin 15036.*—Sin. Loc.: *Dombey s.n.*—Sin. Depto.: Huasohuasi, *Weddell s.n.* and reported by Kränzlin, Tarma, Junin: *Weberbauer 2423.*

Calceolaria corymbosa var. **perennis** Edwin, Phytologia 19: 377. 1970.

Stems leafy, erect and elongate; inflorescences in axils of upper leaves.

Lambayeque: Hacienda Taulis, vicinity of the Casa Hacienda, Prov. Chiclayo, alt. 1,900 m., *Hutchison & von Bismarck 6339.*—Libertad: Samne, Prov. Otusco, along Río Moche, below junction, cliff, alt. 2,500 m., *Pennell & Ferreyra 14887*; Road banks, Samne, alt. 1,900 m., *Hutchison & Wright 6130* (type).

Calceolaria crenata Lam., Encycl. 1: 556. 1783. *C. amplexicaulis* HBK., Nov. Gen. et Sp. 2: 384. 1817. *C. floribunda* HBK., Nov. Gen. et Sp. 2: 385. 1817.

Erect subshrub, stems little to much branched, fistulose, pilose or glandular-pilose. Leaf blades sessile, lance-oblong to narrowly lance-ovate, up to 12 cm. long and 2.0–3.5 cm. wide, hirtellus or pilose above, hirsute or glandular-pilose beneath, crenate- or dentate-serrate, ovate or cordate at base, amplexicaul or almost so, often glutinous; flowers in corymbs or umbellate corymbs; peduncles glandular-pilose, up to 12 cm. long; calyx lobes externally and often internally glandular-pilose, ovate, 2–3 mm. long and 2.0–2.5 mm. wide, veins often obvious; corolla yellow, glabrous, upper lip a little longer than

the calyx, lower lip up to 2 cm. long and 1.5 cm. wide, saccate less than half its length, the orifice closed by the upturning of the sac to the upper lip; stamens very short, anther locules equal, less than twice as long as wide. (Description after Kränzlin.)

Only photographs and fragments seen. This taxon is included provisionally. The material attributed by Kränzlin to Peru may pertain rather to Ecuador.

Calceolaria crenulata Pennell, Proc. Acad. Nat. Sci. Phila. 97: 169, *pl. 14 C.* 1945.

Erect, lax, branched herb, stems appressed-hirsute, with multicellular, brown-jointed hairs. Leaves oblong-ovate, blades 5–8 cm. long and 2.5–3.0 cm. wide, crenulate, glandular-puberulent above, hirsute with brown, appressed hairs, on mid-rib and main veins beneath, apex acute, rounded to base; petioles frequently more than 1 cm. long, thickened, densely hirsute with appressed, brown hairs; inflorescences of a few pairs of 1-compound cymes; basal peduncles 4–5 cm. long; pedicels decreasing apically, all stalks hirsute; primary bractlets small, leaf-like; sepals ca. 3 mm. long, lanceolate, obtuse, entire, densely, minutely hirsute on both sides; corolla yellow, externally puberulent, internally hirsute in a circle around the orifice, upper lip ca. 5 mm. long, slightly wider than the base of the 30 mm. long lower lip that is upturned and forms a sac oneh-alf to two-thirds its length; anthers brown, rounded, the almost globose cells dehiscing through the septum; style 2–3 mm. long, glandular-puberulent basally. Known only from the type collection. (After original description.)

Cuzco: Prov. Paucartambo, E. slope of Cord. de Caravaya along Río Yanamayo, rocky stream-bank in forest, below "Pillahuata" SE. of Paso de Trés Cruces, alt. 2,100–2,300 m., *Pennell 14036*.

Calceolaria croceopunctata Edwin, Phytologia 19: 378. 1970.

Shrub, erect, branched, internodes distant, up to ca. 13 cm. long, about 4–6 times longer than the leaves near the base to only 2–3 times longer than the leaves below the inflorescences, current wood sparsely pubescent with recumbent white hairs, soon glabrate, bark drying smooth. Leaf blades (very) short-petiolate, ovate, mostly 2–3 cm. long and 1.0–1.3 cm. wide, crenate, acute at apex, obtuse to subtruncate at base, rugulose, sparsely puberulent above, densely tomentose-lanose on the veins and very densely punctate with sessile, shining, orange punctations beneath; petiole densely lanate, up to

3 mm. long, reduced leaves often present in the axils; inflorescences paired, many-flowered, dichasiate-panicles, in the upper leaf axils of stems and branches; peduncles 2–3 cm. long; pedicels 1–2 cm. long, all flower-stalks densely lanate; flowers 13–17 mm. long; calyx lobes dimorphic on each flower, lance-elliptic or ovate, 7 mm. long and 3 mm. wide or 6–7 mm. long and 5 mm. wide, pubescent-puberulent on both surfaces; corolla yellow, minutely papillose, a tuft of white hair within at the base, upper lip 4–6 mm. long, lower lip 9–12 mm. long, saccate less than half its length, sac only little wider than proximal part of lip; filaments 1.0–1.5 mm. long, anther cells equal, sagittate, each pair 3.0–3.4 mm. long, each cell ca. 1.2 mm. wide, an acumin developed at the apex of the septum; style ca. 6 mm. long, very long for the flower, exceeding the upper lip of the corolla; ovary glandular-pubescent, glands stalked, red; capsule broadly deltoid-ovoid, acute vesture as the ovary, much shorter than the calyx, 3.5 mm. long and about as wide at the base.

Known only from the type.

Chachapoyas: Cerro Tinaja, alt. 3,200 m., *Ochoa 1686* (US).

Close to *C. rugulosa* Edwin, from which it differs in leaf-size, vesture (orange punctations beneath), style length, and anther size and shape.

Calceolaria cuneiformis R. & P., Fl. Peruv. 1: 19, *t. 27, fig. b.* 1798. *C. rotundifolia* HBK., Nov. Gen. et Sp. 2: 382. 1817. *C. foliosa* Meyen. ex. Walp. et Schau., in Nov. Acta. Acad. Nat. Cur. 19: Suppl. 1. 295. 1843.

Shrubby, erect and branched, pubescence on wood and foliage variable, occasionally almost glabrous, wood usually hirsute or pilose. Leaves variable in shape, ovate to more often triangular-ovate, occasionally very broadly ovate, not infrequently triangular, rarely subrotund, 0.4–2.0(–3.2) cm. long and 0.2–1.0(–1.5) cm. wide, mostly 0.7–1.5 cm. long and 0.5–0.9 cm. wide, margin crenate or dentate or few-lobed, rarely many-lobed, cuneate at base, obtuse to subacute apically, hirsute above, pilose beneath, rarely vesture wanting, often obscuring the tissue beneath, at least in part; inflorescences terminal, axillary, irregularly branched, few- to usually many-flowered; flower stalks up to 2 cm. long, glandular-pilose; bracts minute, scattered; calyx segments shining, ovate, ca. 8 mm. long and 5 mm. wide near the base, acute, densely glandular-pilose; corolla yellow, ca. 1.5 cm. long and distally 1 cm. wide; upper lip shorter than the calyx, lower

lip saccate less than half its length; filaments short, anther cells contiguous, almost twice as long as wide to only little longer than wide; style 2–3 mm. long; ovary and capsule glandular-pilose.

The distribution of this taxon is quite broad. It has been collected in concentration in Dept. Lima and then scattered collections to almost the southernmost department (Moquegua).

Apurimac: Prov. Abancay, Curahuasi, alt. 2,800 m., *Marin 1926*; Prov. Condehuaylos, Moyobamba, alt. 3,650 m., *Vargas 8730*; 2 km. S. of Chincheras, shrubland, alt. 2,800 m., *Stork & Horton 10734*.—Arequipa: Canyon above Arequipa, alt. 2,700–3,300 m., *Pennell 14271*; Lower slope of Chachami 3,170 m., *Hutchison & Wright 7227*; 9,000 ft. alt., *Sandeman 3809*.—Huancavelica, Prov. Castrovirreina, near Córdova, alt. 3,050–3,300 m., *Ferreyra 6976*; Valley of Río Rimac, near Lima-Aroya, 70 km. E. of Lima, alt. 1,850 m., *Goodspeed 33122*; Río Blanco, alt. 3,000–3,500 m., open hillside, *Killip & Smith 21584*; *21585*; *21703*; *21736*; Matucana, rocky hilltop, alt. ca. 8,000 ft., *Macbride & Featherstone 682*; Huaros, alt. 3,400–3,500 m., *Pennell 14713*; Rocky bank above Río Blanco, alt. 3,500–3,700 m., *Pennell & Maldonado 15939*.—Moquequa: Carumas, rainy-green formation, alt. 3,200 m., *Weberbauer 7292*.—Puno: Prov. Puno, 10 km. from Chucuito, on road to Puno, alt. ca. 4,000 m., *Metcalf 30690*.

The wide altitudinal range, from 1,850 to 4,000 m., as well as its latitudinal dispersion (see above) may account for the morphological variability expressed by this species.

Calceolaria cypripediiflora Kränzl. in Fedde, Rep. Spec. Nov. 1: 101. 1905. *C. furcata* Pennell, Proc. Acad. Nat. Sci. Phila. 97: 152. 1945. *C. drepanantha* Pennell, l.c. 97: 154. 1945.

Herb, erect and most often pubescent, hair occasionally white to usually brownish, or doubly pubescent with long brown and short white hairs, mostly much branched. Leaves long-petioled, ovate or oblong-ovate, occasionally elliptic-ovate, rarely subglabrous, usually hirsute or pilose, sometimes densely so beneath, the vesture obscuring the tissue; blades 2.5–7.5 cm. long and 2.5–5.0 cm. wide, margins grossly crenate-dentate or doubly dentate, apex acute to obtuse, base rounded to cordate, tissue most often paler beneath; petiole mostly 0.8–2.5 cm. long; inflorescences branched, often corymbose, few- to several-flowered; flower-stalks with vesture as the stems or denser; flowers 30–45 mm. long; calyx lobes equal or unequal, often reflexed at anthesis, 5–10 mm. long, lanceolate to ovate, acute, entire, externally hirsute or pilose, internally glabrous; corolla yellow, externally

pubescent, upper lip 4–10 mm. long, lower lip 25–40 mm. long, saccate up to half its length and the sac often canaliculate, the non-saccate, proximal part very narrow, ca. 3–4 mm. wide; filaments short, anther cells equal, 1.5 times or more longer than wide, each pair of cells 3–4 mm. long; style 4–6 mm. long, little thickened, apically incurved, ovary densely glandular-pubescent; capsule little longer to little shorter than the calyx, vesture as the ovary.

Ayacucho: Moist rocks near a brook, Choimacota Valley, Prov. Huanta, alt. 3,100–3,200 m., *Weberbauer 7577*.—Cuzco: Macchupicchu, alt. 2,100 m., *Cook & Gilbert 847*; alt. 2,000 m., *Rauh-Hirsch P855*; Macchu-picchu, Prov. Convencíon, alt. 2,400 m., *Vargas 840*, type of *C. furcata* Penn.; Puyupatamarca, Prov. Urubamba, on rocks, alt. 3,400 m., *Vargas 2779*; Shrub on open rocky places, Lares Valley, Huallhuayoj, Prov. Calca, alt. 2,200–2,300 m., *Weberbauer 7901*, the type of *C. drepanantha* Pennell.—Puno: Near Limbani, Prov. Sandia, wet mountainside, alt. 3,200–3,450 m., *Metcalf 30541*.

Calceolaria decus-montium Kränzl. in Engler., Bot. Jahrb. 54: Beibl. 119. 20. 1917.

Small, caespitose, densely lanate, little-branched shrub, sterile shoots not exceeding 5 cm. tall, fertile shoots up to 18 cm., wood, foliage and inflorescences densely beset with long, soft, white hairs. Leaves lanceolate, with the hair silvery, the largest 8 mm. long and 3 mm. wide; flowers apical in 1 or 2 pairs on the fertile stems (due to the abortion of 1 of the flowers of a simple dichasium); pedicels up to 2 cm. long, usually shorter; calyx lobes ovate-lanceolate, 8 mm. long and 3 mm. wide, acute, internally glabrous except for the pilose margins; corolla yellow, up to 27 mm. long, usually at least 23 mm. long and 2 cm. wide, densely white villose internally at base, upper lip ca. 5 mm. long, cap-like, short-pilose, lower lip obovate to almost orbicular, externally glabrous; filaments minute, anthers 2–3 mm. long, 1.5 times longer than wide, cells divaricate; style 1–2 mm. long, ovary ovate, short-setose; capsule unknown. (Description after Kränzlin.)

Known only from the type material.

Piura: Prov. Huancabamba, between Huancabamba and Jicate, alt. 2,500–2,600 m., *Weberbauer 6329* (F).

Calceolaria deflexa R. & P., Fl. Peruv. 1: 18, *t. 30, f.b.* 1798. *C. fuchasiaefolia* Hemsl., The Garden, 258. 1879.

Essentially glabrous, erect or climbing shrub, stems branching. Leaves either glabrous, lanceolate, lance-ovate or narrowly oblong-ovate, usually 4–8 cm., long and ca. 1–3 cm. wide, minutely serrate to entire, mostly acute at both ends, sometimes subobtuse at base, bicolorous, paler beneath, veins subobscurely reticulate to subobsolete, petiolate, or leaves ovate, 2.5–4.0 (–4.5) cm. long and 0.7–2.0 cm. wide, with veins reticulate beneath; petioles up to 1 cm. long; inflorescences few-flowered, not exceeding 8 (–12)-flowered, terminal or axillary, subumbellate or corymbose or occasionally dichasiate; flower-stalks minutely puberulent or glabrous; basal peduncles 2–4 cm. long; calyx glabrous, sepals ovate, acute, 3–4 (–6) mm. long, 2–3 (–5) mm. wide; corolla yellow or orange, upper lip of corolla about twice as long as the calyx (ca. 0.8–1.0 cm. long), hooded, paler than the lower lip that is from little longer to almost twice as long as the upper, occasionally a little more than twice as long (up to 2.2 cm. long), suborbicular, usually saccate over three-fourths of its length, glabrous except for a dense tuft of white hairs at the base internally; filaments very short, often pilulose, thecae equally divergent, each pair ca. 2.5–3.0 mm. long, less than twice as long as wide; style 3.5–4.5 mm. long, stigma punctiform, ovary glabrous; capsule ovoid, acute, glabrous, much longer than the calyx. Separable into 2 distinct varieties.

Leaves more than 2.5 times longer than wide, lanceolate, lance-ovate or narrowly oblong-ovate..... *C. deflexa* var. *deflexa*.

Leaves up to 2.2 times longer than wide, usually less, ovate or elliptically ovate..... *C. deflexa* var. *aurantiaca*.

Calceolaria deflexa R. & P. var. **deflexa**

Ancash: Prov. Bolognesi: Huayalpampa, alt. 3,600 m., *Ferreyra 381*; Cerro Chiquián, alt. 3,360 m., *Ferreyra 400*; Arriba de Chiquián, alt. 3,500–3,800 m., *Ferreyra 6220*; Prov. Huaraz, alt. 3,000 m., *Nuñez 3194*; Copa Grande, north of Chancos, along stream, alt. 3,350 m., *Pennell 15362*; Along stream Colcas, alt. 2,800–2,900 m., *Pennell 14382*; Paso de Fortaléza, above stream, alt. 3,350 m., *Pennell 15397*; Cerro San Cristobál, west of Huaraz, alt. 3,300–3,350 m., *Pennell 15444*; Cajamarca: Along Río Lulichuco, alt. 2,600–2,700 m., above (sw.) Cajabamba, *Pennell & Ferreyra 14860*.—Libertad: Bombamarca, city of Bombamarca, slope of E. Cordillera, alt. 10,000–12,000 ft., *Carricker s.n.*; Huamachuco: wet cliff, alt. 3,250 m., *Pennell & Ferreyra 14870*.—Lima: near Infiernillo, between Matucana and Tarma, alt. 3,350–3,400 m., *Ferreyra 6255*; Open hillside, Río

Blanco, alt. 3,000–3,300 m., *Killip & Smith 21674*; *21676*; along Río Chillon, above Obrajillo alt. 3,100–3,300 m., *Pennell 14408*; Cerro Colorado east of Canta, alt. 3,800–4,000 m., *Pennell 14659*; Moist stream bank, above Río Blanco, alt. 3,500–3,700 m., *Pennell & Moldenado 15932*; Alt. 3,500–3,600 m., *Pennell & Moldenado 15941*.—Sin. Dept.: Río Blanco (Lima?), alt. ca. 12,000 ft., *Macbride & Featherstone 713*; In *Rubus* thicket below Chavanillo, Río Marañon, alt. 7,500 ft., *Macbride & Featherstone 1983*; Obragillo, *Nee s.n.*; Ceuchin or Cheuchin, *Ruiz* and *Pavon s.n.*—Sin. Loc.: *Dombey s.n.*, *Ruiz s.n.*

Calceolaria deflexa R. & P. var. **aurantiaca** Edwin, Phytologia 19: 378. 1970.

Climbing shrub with orange corolla, differing from the typical variety in having ovate leaves usually less than twice as long as wide, rarely reaching twice as long as wide.

Ancash: Western slope of Cordillera Negra below Paso de Collán. Rocky slopes and banks, alt. 3,650 m., *Pennell 15478*, type collection.

Calceolaria delicatula Kranzl. in Fedde, Rep. Sp. Nov. 1: 102. 1905. *C. conocarpa* Pennell, Proc. Acad. Nat. Sci. Phila. 97: 172, *fig. 15b*. 1945.

Erect or lax, branched herb with glandless or gland-tipped hair, internodes usually longer than the leaves, stems and inflorescences soft-pubescent. Leaves petiolate, ovate in outline, very variable in size with most either pinnatifid proximally with 2 pairs of pinnae cut almost to the midrib and distally with further pinnae that unite into a wide mid-blade, the distal segments irregularly doubly, sharply dentate, pilose above and beneath or blades irregularly dentate-laciniate, lobed near the base, occasionally lowest blades basically dentate with 2 pairs of denticulate lobes, 1.3–7.0 cm. long and up to 5 cm. wide, acute apically; petioles 1.0–2.5 cm. long; inflorescences glandular-hirsute, simple to 3–4 times compound cymes, in terminal pairs or from the upper leaf-axils, rarely flowers solitary, basal peduncles 4–10 cm. long, remaining stalks proportionately shorter; bracts and bracteoles reduced, leaf-like, pinnate, smallest bracteoles lanceolate; sepals ovate or triangular-ovate, 6–8 mm. long, margins ciliate; corolla yellow, externally glabrous or subglabrous, internally pubescent at base beneath; upper lip ca. 2.0–2.5 mm. long, lower lip 10–14 mm. long, saccate over most of its length, sac brighter yellow; filaments pubescent, both anther cells fertile, upper only little shorter

than the combined length of the connective and lower, smaller cell; style 1–2 mm. long, slightly distally curved; capsule conic, glandular-pubescent, longer than the calyx, 7–8 mm. wide at base.

This taxon is distributed from Cajamarca in the north to Puno in the south with its greatest concentration from Lima to Cuzco. Citations selected from the copious material.

Ancash: Lomas de Casma, Prov. Santa, alt. 400–500 m., *Ferreyra 8054*.—Ayacucho: Pampalca, between Huanta and Río Apurimac, alt. ca. 3,200 m., *Killip & Smith 22210*; *22257*.—Cajamarca: Monte seco, Prov. Hualgayoc, alt. 1,800 m., *Soukup 2835*.—Cuzco: Above Paucartambo, alt. 11,500 ft., *Balls 6722*; Near Río Quencomayo, below Colquipata, alt. 3,200–3,300 m., *Pennell 13774*; Near Río Yanamayo, below "Pillahuata," alt. 2,900–3,200 m., *Pennell 13794* (type collection of *C. conocarpa*); Macchu-picchu, alt. 2,000 m., *Rauh-Hirsch P856*; Hda. Ayusbamba, alt. 3,400 m., *Vargas 859*; Tió, Marcapata, alt. 1,900 m., *Vargas 3074*; Québrada de Llulluchayoc, alt. 3,100 m., *Vargas 4292*; "Pillahuata," Paucartambo, alt. 2,400 m., *Vargas 4899*; Near Asuncíon Bridge, Río Apurimac, alt. 3,730 m., *Vargas 11028*.—Huancavelica: near Córdova, alt. 3,050–3,300 m., alt. *Metcalf 30289*.— Huanuco: Carpish, 60 km. between Huanuco and Tingo Maria, *Swingle 72*.—Junin: At bridge, valley bottom, Canyon of Río Huasahuasi, below Huasahuasi, alt. 2,400 m., *Hutchison 1139*; Carpapata, above Huacapistana, alt. 2,700–3,200 m., *Killip & Smith 24368*.—Libertad: Trujillo, alt. 500 m., *Angulo 2004*; Cerro Campana, Prov. Trujillo, alt. 675 m., *López 1688*.—Lima: Between Huaral and Huacho, lomas de Lachay, alt. 400–600 m., *Ferreyra 3862*; Various locations alt. 2,700–3,600 m., *Pennell 14363*; *14364*; *14399*; *14403*; *14534*; *14703*; Matucana, alt. ca. 8,000 ft., *Macbride & Featherstone 103*; Hacienda Balconcillo, *Soukup 2147*; Chosica, alt. 800 m., *Soukup 2149*.—Puno: Near rocks and in water, near Limbani, Prov. Sandia, alt. 3,200–3,450 m., *Metcalf 30486*.

Calceolaria dentifolia Edwin, Phytologia 19: 379. 1970.

Erect shrub, little branching on the upper half, wood, foliage, flower-stalks, calyx tube and calyx lobe margins densely beset with gland-tipped hair and with sessile or subsessile glands, the hair frequently 2-celled. Leaves subcoriaceous, short-petiolate, ovate, mostly 6–10 cm. long and 2–4 cm. wide, long-acute to acuminate at apex, subobtuse and dimidiate at base, margins irregularly and very sharply, doubly serrate, midvein often conspicuously elevated be-

neath; petioles thickened, up to 1.3 cm. long; inflorescences simple or branching, corymbose, subtended by a pair of reduced leaves, terminal on the main stem and on branches from the upper leaf-axils; basal and intermediate peduncles 2–3 cm. long; pedicels much shorter than the peduncles; calyx lobes lance-elliptic to lance-ovate, long-acute to acuminate, the anterior lobe narrower than the others, ca. 10 cm. long and 4–6 mm. wide, sparsely puberulent externally, oscillate internally, oscillae sunken; corolla large for the genus, yellow, upper lip sparsely puberulent, hooded, up to 10 mm. long, much overtopping the genitalia, lower lip 30–35 mm. long and up to ca. 25 mm. wide, saccate most of its length, externally sparsely puberulent or glandular with sessile glands, the vesture in patches, occasionally glabrous, internally with a tuft of hair at the base; filaments about 3 mm. long, very thickened, flattened, about 2 mm. wide, anther cells unequal, large, each pair 6.5–7.5 mm. long; style ca. 7 mm. long, thickened, apically incurved, stigma enlarged or not, punctiform-capitate, ovary glutinous, sparsely glandular, glands golden, sessile; capsule not seen.

Cajamarca: Shrub, along stream E. of Cordillera de Cumulloa on road to Celendin, 3,400–3,500 m. alt., *Pennell 15162*, type collection; Cajamarca–Celendin road, km. 90, *Olsson s.n.*, February 11, 1948. Leaves sticky.

Close to *Calceolaria endopogon* Kränzl. and *C. salicifolia* R. & P. differing from both in vesture. In addition, this taxon differs from *endopogon* in leaf-margins and in the structure of the inflorescence. *Dentifolia* differs from *salicifolia* in leaf-shape and petiole length.

Calceolaria dichotoma Lam., Encyc. Meth. Bot. 1: 555. 1783. *C. ovata* Smith, Icones 1: 3, *tab. 3*. 1789. *C. biflora* R. & P., Fl. Peruv. 1: 16, *tab. 20*. 1798. *C. anagalloides* Kränzl. in Fedde, Rep. Sp. Nov. 1: 84. 1905. *C. lysimachioides* Kränzl., l.c., 84. *C. meistantha* Pennell, Proc. Acad. Nat. Sci. Phila. 103: 96, *fig. 1*. 1951.

Annual herb, usually up to about 15 cm. tall, erect or ascending, branching dichotomously over most of its length, foliage, branches, flower-stalks and calyces variously soft, white pubescent. Leaves ovate, short- to moderately petiolate, up to about 5 cm. long and 4 cm. wide, usually not exceeding 3.5 cm. long and 2.8 cm. wide, acute to subacute at apex, rounded at base, sometimes subobtuse, pubescence most often scattered on both surfaces, margins entire to irregularly serrulate; petioles up to about 1 cm. long, little if at all thickened; flowers usually axillary, solitary and in pairs, sometimes

also in few-flowered, terminal dichasia on the branches; pedicels and peduncles usually short, up to ca. 2.5 cm. long, most often not exceeding 1.5 cm.; flowers small, 6–9(–10) mm. long; calyx lobes 2.5–5.0 mm. long, elliptical to ovate; corolla light yellow, upper lip ca. 0.5–2.0 mm. long, lower lip 5–8 mm. long, saccate up to about one-half its length; filaments long, up to 5 mm., thin, anther cells very small, usually each pair not exceeding 1 mm. long, sometimes confluent, the anther seeming unilocular; style ca. 2 mm. long, ovary glabrous or almost so; capsule broadly ovoid, a little longer than the calyx, apically obtuse, often notched, the usually persisting style within.

Ayacucho: Aina between Huanta and Río Apurimac, alt. 750–1,000 m., open woods, *Killip & Smith 22813*; Evergreen bush wood near Quillamito, Choimacota Valley, Prov. Huanta, alt. 1,300–1,400 m., *Weberbauer 7542*.—Cajamarca: In full exposure, Llama, Cutervo, alt. 7,500 ft., *Sandeman 4200*; Plowed ground alt. 3,000 m., SW slope, Paso de Gavilán, S. of Cajamarca, *Pennell & Ferreyra 14965*.—Cuzco: San Miguel, Urubamba Valley, alt. ca. 1,800 m., *Cook & Gilbert 924*; Amaibamba, Prov. Convencíon, in cultivation, *Marin 1575*; alt. 1,650 m., *Scolnik 813*; *Vargas 3423*.—Lima: Lomas de Quilmana, between Lurin and Cañete, alt. 480–500 m., *Ferreyra 3989*; Lomas de Atocongo, Prov. Lima, alt. 300–400 m., *Ferryra 4017*; Lomas de Caracolas, between Lurin and Cañete, alt. 490–500 m., *Ferreyra 6281*; Sandy lomas along the sea, Lurin, alt. ca. 200 ft., *Macbride 5969*.—Piura: Herb in wet maize field, Canchaqui, alt. 1,200–1,600 m., *Pennell & Ferreyra 14893*.—Sin. Dept.: Lucumayo Valley, alt. 1,800–3,600 m., *Cook & Gilbert 1397*.

Calceolaria divaricata HBK., Nov. Gen. et Sp. 2: 381. 1817.

Herb or subshrub, stem glabrous, floriferous, branchlets sparsely puberulent at the apex and very divergent. Leaves short-petiolate except the sessile uppermost, ovate, up to 4 cm. long and 3 cm. wide, grossly crenate-serrate, acute at apex, subcordate at base, bright green and glabrous above, manifestly reticulate-venose and pilose, especially on the margins, beneath; petioles (the lowermost) up to 1.2 cm. long, basally connate and thickened; flowers in corymbose inflorescences, ultimate branchlets divaricate, dichasiate; the thin pedicels 1.0–1.5 cm. long and with the calyces glandular-pilose; calyx lobes broadly ovate, acute, 3 mm. long and 2 mm. wide at base; corolla yellow, 1.5–1.8 cm. long, lower lip saccate less than half its length; stamens short, anthers large.

No specimens seen. Reported from Piura: near Succhubamba and Ayavaca (Ayabaca), alt. 2,800 m., *Humboldt & Bonpland.*

Calceolaria endopogon Kränzl. in Engler, Bot. Jahrb. 54: Beibl. 119, 18. 1917.

Subglabrous to often glabrous vine, stem and branches sometimes glutinous, often purple-dotted in drying. Leaves petiolate, elliptic-ovate to ovate, large for the genus, up to 10 cm. long or even longer and about 5 cm. wide, entire or almost so, apically acute, frequently dimidiate near the narrowed base, veins conspicuous or not beneath, darker above, paler beneath; inflorescences few-flowered, subdichasiate to racemose; pedicels and peduncles thin, glabrous, peduncles up to 10 cm. long, pedicels to 5 cm. long; floral leaves only a little smaller than the stem leaves; flowers large for the genus; calyx lobes 9–12 mm. long, glabrous, oblong to ovate-oblong, acute, margins fimbriate; corolla yellow, externally glabrous, upper lip well developed, sometimes almost as long as the calyx lobes, more often only about half as long, internally beset with long, white, stiff hairs on the lower edge; lower lip about 30 mm. long, saccate over three-fourths its length, internally pubescent as the upper lip, sac very inflated in life and upcurved distally; anthers on short filaments, cells very unequal, each anther large for the genus, 7–9 mm. long and about a third to a fourth as wide, cells divaricate; style 7–8 mm. long, glandular at the base, apically abruptly curved, ovary densely glandular-puberulent.

This taxon has been sporadically collected in the Andes of northern Peru.

Cajamarca: Road from Cajamarca to Celendin, km. 95, *Olsson s.n.*; Thicket on mountain E. of Celendin, alt. 2,700–2,900 m., *Pennell 15210*; Hills W. of Celendin, alt. 2,700–3,000 m., *Pennell 15218.* —Piura: Huancabamba, West side of Cordillera E. of Huancabamba, alt. 3,000 m., *Weberbauer 6136* (Isotype F); Above Huancabamba, alt. 3,000 m., *Weberbauer 6147.*

Calceolaria engleriana Kränzl. in Fedde, Rep. Sp. Nov. 1: 106. 1905. *C. epilobioides* Kränzl., Ann. K. K. Naturh. Hoefm. Wein. 22: 194. 1907. *C. urubamba Kränzl.*, Pflanzenr. IV(257C): 109. 1907. *C. incachacensis* Kränzl. in Fedde, Rep. Sp. Nov. 27: 20. 1929. *C. viminalis* Kränzl. in Fedde, l.c. 21. 1929. *C. endotrachys* Kränzl. in Fedde, l.c. 22. 1929. *C. engleriana* subsp. *acuminata* Pennell, Proc. Acad. Nat. Sci. Phila. 97: 158, *t. 10A.* 1945.

Erect branched shrub, wood usually tomentulose above becoming glabrous below. Leaves short-petiolate or the upper blades sessile, narrowly ovate-lanceolate to lanceolate, occasionally ovate, up to about 6.0 cm. long and 2.6 cm. wide, usually narrower, not infrequently 5–9 mm. wide, entire to serrulate, apex usually acute, less often short-acuminate, variously pubescent to occasionally glabrous; petioles thickened and laterally connate, sometimes woody; inflorescences few-flowered corymbs; flower-stalks puberulent; calyx lobes green to yellow-green, ovate or narrowly ovate, acute, 5–7(–8) mm. long, externally sparsely puberulent and often red-gland-dotted, sometimes reflexed at anthesis, internally more densely hairy, some of the hairs arranged in a row along the margins; corolla yellow, upper lip ca. 4–6 mm. long, shorter to occasionally little longer than the calyx lobes, lower lip 18–28 mm. long, saccate more than half its length, distally upturned; anther cells more than twice as long as wide, filaments shorter than the 2 mm. long, apically curved style; ovary glandular; capsule a little shorter to equaling the calyx, ovate, gradually narrowed to apex but lacking an abruptly constricted neck, densely glandular.

Found throughout the Andes of southern Peru, especially in Cuzco.

Apurimac: Quishuala, road between Abancay and Andahualas, alt. 11,500 ft., *Balls 6893*.—Ayacucho: Between Huanta and Hacienda Pagora, alt. 3,700–4,200 m., *Killip & Smith 22189*; *23297*; *23300*.—Cuzco: Alt. 3,300–3,500 m., *Herrera 526*; "Ppucuchu-ppucuchu," Urubamba Valley, alt. 3,000 m., *Herrera 1525*; Colinas de Saxaihuamán, alt. 3,600 m., *Herrera 2367*; Québrada de Quispicanchi, alt. 2,350 m., *Herrera 2621*; Valle de Paucartambo, alt. 3,400 m., *Herrera 2989*; near Wenner Gren ruins, Prov. Urubamba, alt. 3,400–3,600 m., wet places, *Metcalf 30763*; Sacsahuamán, above Cuzco, stream bank, alt. 3,500–3,600 m., *Pennell 13545*; Cuzco, alt. 3,500–3,600 m., *Pennell 13702*; Huancalli, open rocky banks, alt. 3,400–3,500 m., *Pennell 13712*; Pisac, rocky canyon E. of Pisac, alt. 3,300–3,500 m., *Pennell 13722*; Cerro de Colquipata, puna, alt. 3,900–4,000 m., *Pennell 13746*; near Río Quencomayo, below Colquipata, alt. 3,200–3,300 m., *Pennell 13778* (type of *C. engleriana acuminata* Pennell); Cerro de Colquipata, trail from Paucartambo to Caicai, alt. 3,400–3,700 m., *Pennell 14178*; Vilcanota below Caicai, alt. 3,300–3,500 m., *Pennell 14193*; Cordillera Veronica, alt. 2,900 m., *Rauh–Hirsch P969*; 3,700 m. alt., *Reitz 5986*; Sacsahuamán, *Soukup 21*; outskirts of Cuzco, *Soukup 127*; Chocta, near roadside, alt. 3,400 m.,

Vargas 228; Anta, alt. 3,650 m., *Vargas 298*; Huanoquita, Prov. Paruro, alt. 3,380 m., *Vargas 2359*; Juncaipata-Sta Rita, Prov. Urubamba, alt. 2,800 m., *Vargas 2670*; Hacienda Cachupata, Prov. Paucartambo, alt. 3,500 m., *Vargas 2851*; Colinas del Rodadero, *Vargas 3132*; Prov. Calca, alt. 3,200 m., *Vargas 3620*; Chenchamayo, Prov. Paucartambo, *Vargas 4303*.—Huancavelica: Pumalucana to Conaica, alt. 3,500–3,550 m., *Tovar 79*.—Puno: 1 km. from Cuyocuyo, on road to Sandia, alt. 3,600 m., *Metcalf 30715*.—Sin Depto: Lucamayo Valley, alt. 1,800–3,600 m., *Cook & Gilbert 1327*; Ollantaytambo, 3,000 m. alt., *Cook & Gilbert 597*; *658*; Pinasniocj, Panticalla Pass, alt. 3,600 m., *Cook & Gilbert 1815*.—Sin. Loc.: *Weberbauer 5478*.

One of the commonest "slipper-flowers" in the southern Andes of Peru. This taxon is quite easily recognized due to the long, narrow leaves, anther cells, and corollas.

Calceolaria extensa Benth. in DC., Prodr. 10: 214. 1846.

Shrub, usually much branched, the branches ascending, sometimes square on the upper part, older wood tomentose, youngest puberulent. Leaves short-petiolate, oblong-lanceolate, up to 2 cm. long, usually not exceeding 1.5 cm. and 5 mm. wide, crenate or grossly crenate, acute at apex, cuneate to long-cuneate at base, subglabrous above, paler and densely pubescent on the venation beneath; inflorescences few-flowered corymbs, only little exceeding the leaves; branchlets and flower-stalks papillose-pilose; bracts linear or almost so, obtuse; calyx dimorphic, on some plants either densely pilose externally with the segments ovate, subacute to acuminate, 5–6 mm. long and 4–5 mm. wide, or oblong-lanceolate, 7–10 mm. long and 3 mm. wide and glabrous; upper lip of the yellow, externally sparsely papillose or glabrous corolla, minute, reduced to a narrow ring, lower lip ca. 1.5 cm. long, saccate about half way, about 8–10 mm. wide distally; filament ca. 3 mm. long, anthers divergent, ca. 1.5 times longer than wide; style ca. 1.5–3.0 mm. long, ovary glabrous to sparsely glandular; capsule not seen.

Ayacucho: Prov. Lucanas, between Nazca and Puquio, alt. 3,200–3,300 m., *Ferreyra 5462*; above Puquio, alt. 3,400–3,500 m., *Ferreyra 5525*; Allpaja, ca. 6 km. from Puquio, alt. 3,300–3,400 m., *Ferreyra 7191*.—Sin loc. alt. 2,407 m., *Soukup 4003*.

Also reported from the departments of Ancash and Lima as well as from southern Bolivia.

Calceolaria fiebrigiana Kränzl. in Fedde, Rep. Sp. Nov. 1: 84. 1905.

Herb, frequently scapose or subscapose, scape or stems white-pilose. Leaves broadly ovate, up to 15 cm. long and 8 cm. wide, variously pubescent on one or both surfaces, veins sometimes prominent beneath, margins grossly sinuate-dentate, apex acute, base often cordate, sessile or short-petiolate; petiole when present up to 5 mm. long, winged by the attenuate leaf-base; inflorescences usually much branched and many-flowered, glandular-pilose and often also glutinous; calyx lobes ca. 5 mm. long and 3 mm. wide, usually glandular-pilose, occasionally merely pilose, acute; upper lip of the yellow corolla from about half as long as the lower lip to almost as long, lower lip 6–9 mm. long, saccate more than half its length; filaments linear, long, exceeding the flower, anthers small, cells equal; style about as long as the stamens, ovary glandular; capsule broadly ovoid, little longer than the calyx.

Arequipa: *Isern 2016*.—Cuzco: Paucartambo Valley, Hacienda Ccapana, alt. 3,600 m., *Herrera 1083*; La Raya, rock-ledges in cascade, alt. 4,400–4,500 m., *Pennell 13509*; Sin. Loc.: Alt. 4,710 m., *Rauh–Hirsch P1160*; Alturas de Laguna de Sial, alt. 4,300 m., *Vargas 3741*; Environs of San Andres de Checca, alt. 3,860 m., *Vargas 9845*.—Moquegua; Humid rocks, Saylapa near Carumas, alt. 3,300 m., *Weberbauer 7343*.—Puno: Granja Salcedo, scattered among rocks, alt. 3,835 m., *Mexia 4253*; Santa Rosa 50 mi. SSW. of Llave, alt. 4,500 m., *Pearson & Pearson 31*; Near Puno, alt. 4,000 m., *Soukup 255*; *370*.—Tacna: In Chuvire, 1 km. from Challaquaya, Prov. Tarata, alt. 2,500 m., *Metcalf 30408*.—Sin. Loc.: Volcanic Ash, alt. 13,500 ft., *Stafford 670*.—Sin Dept.: Uyumiri, Sicuani, alt. 12,500 ft., *Stafford 962*.

Calceolaria flosparva Edwin, Phytologia 19: 380. 1970.

Prostrate herb, rooting at the nodes, stems and branches glabrous or almost so. Leaves mostly long-petiolate, blades ovate in outline, mostly 1.5–2.8 cm. long and 1.3–2.2 cm. wide, densely to thinly pulverulent beneath, irregularly coarsely dentate, laciniate-dentate and varying to with 1 or 2 pairs of lobes, the lobes irregularly laciniate-dentate, the narrowed base decurrent the length of the petioles that are at least half as long as the blade to almost as long; flowers axillary in upper leaves usually a pair in each axil, pedicellate, only rarely pedunculate; pedicels glabrous, 1.5–2.0 cm. long; calyx glabrous, lobes ovate, subobtuse, about 5 mm. long and 3 mm. wide, margins

very sparsely crenulate; corolla yellow, glabrous, 6–7 mm. long, lower lip only little shorter than the almost wholly saccate upper lip; both anther cells fertile and much smaller than the thickened connective; style about 1.5 mm. long; capsule broadly ovoid, little shorter than the calyx, pubescent, neck lacking.

Thus far found only in Dept. Amazonas: Rocky stream in mountain forest, alt. 3,300 m., above Colcamar, *Pennell 15633* (PH); in seepages, infrequent, uppermost slopes and summit of Cerros de Calla Calla, near Kms. 403–407 of Balsas–Leimebamba road, alt. 3,400–3,550 m., *Wurdack 1711*.

The combination of very small corollas with upper lip only little smaller than lower lip, almost wholly pedicellate flowers, generally glabrous inflorescences, and long-petiolate leaves is not found anywhere else in this subgenus.

Calceolaria glauca R. & P., Fl. Peruv. 1: 17, *tab. 27, fig. e.* 1798.

Stiff, erect, branching shrub; wood in age glabrous, younger minutely puberulent, youngest densely so. Leaves ternate or less often opposite, youngest densely, minutely puberulent on both surfaces, older less so, oldest becoming glabrous above and only sparsely puberulent beneath, both surfaces punctate with shining, golden punctations, lanceolate to lance-ovate, margins entire to irregularly serrulate, denticulate or occasionally ovate with doubly dentate-denticulate margins, mostly up to about 5.0 cm. long and 1.5 cm. wide, usually not exceeding 3.5 cm. long and 1.0 cm. wide or occasionally when ovate and doubly toothed just 2 times longer than wide, acute at apex, usually subobtuse at base; inflorescences irregular, often paniculate or of panicles of dichasia, many-flowered; flowers congested on short, puberulent stalks, mostly 10–13(–15) mm. long; calyx puberulent, ovate, 3–4 mm. long and almost as wide at base, apically acute; corolla yellow, glabrous to sparsely puberulent externally, a tuft of short, white hairs often present internally at the base, upper lip about as long as the calyx and as wide, overtopping the genitalia, lower often saccate three-fourths of its length, the proximal part very narrow and stipe-like; filaments short, anther cells equal, up to almost twice as long as wide, each pair ca. 2–3 mm. long, wholly divaricate; style 1.5–2.5 mm. long, pustulate at base, ovary glandular-pustulate; capsule about as long as wide, broadly ovoid, glandular, apex blunt.

Ancash: Marcara, Prov. Huaras, alt. 3,000 m., *Nuñez s.n.*—Cajamarca: Cajabamba, near the bridge of Lulichucu, alt. 2,600–2,700

m., *Ferreyra 3047*.—Lima: Río Blanco between Matucana and Aroya, alt. 3,500–3,600 m., *Ferreyra 5271*; Rocky ground near San Mateo, alt. 2,600–2,700 m., *Ferreyra 5316*; open hillside Río Blanco, alt. 300–3,500 m., *Killip & Smith 21654*; *21686*; Creek bank, Matucana, alt. ca. 8,000 ft., *Macbride & Featherstone 97*; Surco, Prov. Huarochiri, alt. 1,750–1,900 m., *Nuñez 1708*; Along Río Chillón near Obrajillo, bush banks, alt. 2,200–2,500 m., *Pennell 14327*; alt. 2,600–2,800 m., *Pennell 14358*; Open rocky slopes, alt. 2,800–3,200 m., *Pennell 14395*; San Buenaventura, alt. 2,700–2,800 m., *Pennell 14554*; Canta, alt. 3,000–3,200 m., *Pennell 14600*; *Ruiz & Pavon s.n.*; Pocatulpe–Hulpa, Matucana, Prov. Huarochiri, alt. 3,000–3,400 m. *Vargas 5250*.—Sin. Loc: *Weberbauer 5397*.

The single collections from Ancash and Cajamarca indicate a significantly wider range for this taxon than is presently known.

Calceolaria grandepinnata Edwin, Phytologia 19: 380. 1970.

Soft herb, branching above the middle, stems pubescent with multicellular hair and these frequently thickened and filled with a dark-brown exudate above and at the nodes. Leaves up to 23 cm. long, narrowly ovate to elliptically ovate in outline, very variable, multi-pinnate or -pinnatifid over all or most of their length, pinna sessile or less often stalked, irregularly dentate-laciniate, sometimes the upper part of the leaf merely dentate, pinnae most often reduced in size toward the apex, alternate or opposite, apically acute or long-acute, pubescent on both surfaces with multicellular hair, these often appressed on the upper surface, long- or short-petiolate; petioles thinly connate; inflorescences simple or once-branched cymes, borne in pairs on the branches from the axils of the uppermost leaves; basal peduncle up to 3–4 cm. long, mostly varying in length, densely and laxly gland-tipped-pubescent; pedicels pubescent as the peduncles, abruptly much shorter than the peduncles; bracts and bractioles reduced, lanceolate, otherwise leaf-like; calyx lobes broadly ovate or deltoid, ca. 3–4 mm. long and ca. 3 mm. wide in flower, becoming 9 mm. long and 6 mm. wide in fruit, acute, densely pubescent externally, less so internally, acute, margins entire with the terminals of the veins little protruding; corolla yellow, more or less densely beset with sessile, red glands externally, 13–15 mm. long, upper lip ca. 4 mm. long, hooded, margins rounded, lower lip a little narrower than long, saccate almost its entire length, nectary small, entire, hemispherical, terminal on the internally glabrous sac; one anther cell sterile, the other fertile, almost globular, the connective between the

two longer than either cell and thickened, filament knob-like; style ca. 2.5 mm. long, pubescent near the base, ovary pubescent; capsule as long as or longer than the calyx, broadly triangular-ovoid, pubescent, style persisting at the acute apex, neck lacking.

Distributed in Piura near Canchaqui: Stream ditch, alt. 1,000 m., below Canchaqui, *Pennell & Ferreyra 14891* (US); Alt. 1,000–1,400 m., in wet places *Pennell & Ferreyra 14892*; *Ferreyra 3091*.

Easily separable from all other Calceolarias by the combination of pluripinnate, very long leaves, and the peculiar nodal pubescence.

Calceolaria hedera Edwin, Phytologia 19: 381. 1970.

Climbing shrub with the lax branches and the nodes distant, young wood tomentose, tomentum decreasing with age until older wood almost glabrous, foliage beneath and flower stalks densely lanate. Leaves mostly very broadly ovate in outline, less often almost subrotund, mostly up to 9 mm. wide, sometimes reaching 2 cm. wide, only very rarely exceeding 2 cm. long, mostly up to 15 mm. long, margin revolute, with usually 2 pairs of lateral lobes and a single apical lobe, varying to 1 or 3 pairs of laterals, lobes rounded, usually minutely cordate at base, occasionally truncate or broadly obtuse, pilose above, densely lanate beneath, the indument matted, obscuring the tissue; flower stalks up to ca. 2 cm. long, usually less, not infrequently less than 1 cm. long, occasionally the flowers subsessile; flowers solitary and axillary or in 3-flowered, simple dichasia; branches floriferous over half their length; floral leaves similar to cauline, only little reduced; the short calyx tube and lower parts of the calyx lobes externally densely tomentose, vesture decreasing to the apices of the lobes, internally sparsely pubescent, lobes elliptically, broadly ovate, ca. 6 mm. long and 5 mm. wide, acute, entire; corolla yellow, wholly glabrous or with a very few hairs internally at the base of the lower lip, 14–17 mm. long, upper lip 1–2 mm. long, lower lip saccate more than half its length, sac broadly, abruptly expanded, much wider than the non-saccate part; anther cells equal, divaricate, 2 or more times longer than wide, the upturned distal ends farthest from the floor of the corolla each pair of cells 2–3 mm. long, filaments about 1.0–1.2 mm. long, about half the length of the thickened 2.0–2.5 mm. long style; ovary glandular- or granular-pubescent; capsule unknown.

Known only from the type collection.

Cajamarca: springs in hills, midway between Cordillera de Cumulloa and Celendin, alt. 2,700–3,000 m., *Pennell 15221*.

The leaves are much like the common "ivy" in shape. This taxon is related to *C. cordiformis* and *C. triloba* Edwin but is most easily separable at least at present. Although most of the leaves of this taxon are less than 1 cm. wide, the largest blades indicate the strong possibility that future collections may uncover specimens whose leaves are more than 1 cm. wide. The taxon is keyed therefore under both key entries.

Calceolaria herzogiana Kränzl. in Engler, Bot. Jahrb. 50: Beibl. 111. 69. 1914.

Erect but flaccid, mixed-pubescent; perennial herb with the square stems drying 4-sulcate, densely pubescent with glandular hairs intermixed. Leaves bizarre; petioles winged up to 10 cm. long or occasionally longer, basally dilated, connate, auriculate, margins usually grossly dentate, especially on the lower half; blades (except the sessile, ovate-cordate, smaller, sometimes interfloral uppermost) usually triangular, often at least as wide as long, very variable in size 6–16 cm. long and 5.0–16.5 cm. wide,[1] coarsely, irregularly doubly dentate, acute, bases truncate, retuse or subcordate, pubescent or puberulent beneath on the venation, above sparsely to subdensely puberulent; inflorescences corymbose or dichasiate, few- to many-flowered; peduncles and pedicels pubescent as the stem, basal peduncles 6–10 cm. long, flower stalks decreasing in size apically; calyx glabrous or puberulent, the free sepals entire, eciliate, ovate, 13–23 mm. long, basally up to 13 mm. wide, acute or acuminate; corolla up to 40 mm. long, mostly over 30 mm., glabrous except for a tuft of white hairs within at base of the lower lip, sac usually about two-thirds the length of the corolla, more than half the length of the 30–35 mm. lower lip, upper lip short, ca. 3–5(–7) mm. long, only partly obscuring the genitalia; filaments short, 2–3 mm. long, anther cells divaricate, walls thin, dehiscing through the septum; style 3–5 mm. long, ovary glandular; capsule broadly ovoid, 8–9 mm. long and about as wide at base, glandular at least along the sutures, apically obtuse.

Basically found in southern Peru but extending to central Peru in Junin and Ancash. The southern counterpart of *C. tomentosa* and *C. pavonii*.

Ancash: Prov. Bolognesi, Chiquán, alt. 3,560 m., *Ferreyra 5703*; Encima de Chiquián, alt. 3,350–3,400 m., *Ferreyra 7463*.—Ayacucho: Ccarrapa, between Huanta and Río Apurimac, alt. 2,200 m., *Killip*

[1] According to original description up to 19 cm. wide and 13 cm. long.

& Smith 22314.—Cuzco: Vicinity of Macchu-picchu and Urubamba Valley, alt. 1,800–2,500 m., *Balls 6812*; *Cardenas 4200*; *Cook & Gilbert 1153*; *Herrera 1555*; *Mexia 8074*; *Rick s.n.*; *Soukup 142*; *Vargas 798*; *9818*; Valley of San Miguel, between Cedrabamba and La Maquina, alt. 2,060–2,260 m., *Herrera 1997*; Cerro de Cusilluyoc, thicket, alt. 3,400–3,700 m., *Pennell 13805*; Near Río Yanamayo, below Pillahuata, alt. 2,200–2,400 m., *Pennell 14042*; Pillahuata, Cerro de Cusilluyoc, alt. 3,000–3,300 m., *Pennell 14135*.

Calceolaria heterophylla R. & P., Fl. Peruv. 1: 16, *t. 21, fig. b.* 1798, non Willd. *C. hirsuta* Benth. in DC., Prodr. 10: 212. 1846.

Herb decumbent at base, stems and branches densely beset with long, multicellular, descrete hair, plant drying brown. Leaves distant, long-petiolate, petioles and the veins at least beneath with vesture as the stems and branches, blades ovate, 4–9 mm. long and 3–5 mm. wide, margins crenate-dentate or dentate, acute at apex, subobtuse to obtuse at base; inflorescences corymbose, few-flowered; peduncles and pedicels with vesture as the stems, basal peduncles up to 20 cm. long (fide Kränzlin); bracts lacking; flowers 20–25 mm. long; calyx vesture as the stem, lobes ovate, acute, mostly 7–8 mm. long; corolla yellow, wholly glabrous, ca. 15–18 mm. long, about one-half to two-thirds as wide, upper lip 2–3 mm. long, lower lip saccate less than half its length; filaments ca. 2 mm. long, black when dry, anther cells equal, small, ca. 1.5 mm. long, divergent to divaricate; style 3.0–3.5 mm. long, little if at all thickened; ovary glandular, glutinous; capsule shorter than the calyx, broadly ovoid, only little narrowed to the obtuse apex, the locular suture forming a deep sulcation.

Amazonas: *Mathews 152*, the type of *C. hirsuta* Benth.—Apurimac: Pincos, in sunny sites, Prov. Andahuaylas, alt. 2,600 m., *Stork & Horton 10704*.—Huanuco: Huacachi, station near Muña, alt. ca. 6,500 ft., *Macbride 4154*; *Ruiz & Pavon s.n.*

Collections are from in or near Muña except the Apurimac and Amazonas cited above. These latter seem well within the morphological variation limits for the taxon. The disjunction is quite unusual for the subgenus.

Calceolaria hirsutula Pennell, Proc. Acad. Nat. Sci. Phila. 97: 158. 1846.

Shrubby at the base, erect, hirsutulous with short, spreading, upcurved hairs, stems several from a rhizomatous base, simple or

branched. Differing from *C. chrysosphaera* Pennell in pubescence and also in having smaller calyx lobes, ca. 6–7 mm. long and these green instead of yellow; smaller corolla, ca. 10–12 mm. long; shorter leaves, ca. 3–4 cm. long and also smaller capsules; differing from *C. engleriana* Kränzl. in many of the same ways as well as in having smaller anthers, ca. 2 mm. long and capsules shorter than the calyx lobes; the terminal pedicels in *hirsutula* are shorter than in both *chrysosphaera* and *engleriana*.

Cuzco: Cult. at U. Calif. Bot. Gard. from *Goodspeed 4513*, collected Macchu-picchu; Valle de San Miguel, Macchu-picchu, alt. 2,400 m., *Herrera 1999* (type); Valle del Urubamba, Macchu-picchu, alt. 2,200 m., *Herrera 3223*; Hda. Anaibamba, alt. 1,650 m., *Scolnik 791*; Hda. Potrero, alt. 1,300 m., *Vargas 1181*; Alt. 2,100 m., *Vargas 2507*; Macchu-picchu, alt. 2,000 m., *Vargas 2173*; Hda. Amaibamba, alt. 1,500 m., *Vargas 3426*; Prov. Quispicanchis, Tío to Myrayaca, Marcapata, alt. 1,200–2,000 m., *Vargas 5198*.

Calceolaria humilis Edwin, Phytologia 19: 382. 1970.

Small, branched shrub from a thickened rootstock, several stems rising closely grouped, lower nodes longer, upper sometimes shorter than the small leaves, wood drying wine-red, puberulent as the pedicels and calyx lobes. Leaves ovate, up to 1.5 cm. long and 9 mm. wide, short-petiolate, pulverulent on both surfaces and often puberulent above, yellow-green, glandular beneath, crenulate-serrulate, plane, acute at apex, subacute to subobtuse at base, widest near but not at the base, venation subobsolete and impressed above, prominent and elevated beneath, often with flattened, white puberulence; flowers solitary, crowded, axillary to upper leaves and terminal on the branches and stems; pedicels reddish under the white puberulence, ca. 1 cm. long; bracts leaf-like, reduced; calyx lobes ovate, 3–4 mm. long and almost as wide at base, internally puberulent on the red margins, yellow-green-glandular on the light green tissue, acute; corolla yellow, 9–11 mm. long, upper lip reduced to a ring less than 1 mm. long, lower lip papillose on both surfaces, saccate less than half its length, the proximal part only little narrower than the distal, saccate part; filament ca. 1 mm. long, thickened, red; anther cells equal, divergent or divaricate, each pair 2 mm. long and 1 mm. wide; style ca. 1.0–1.5 mm. long, thin, ovary papillose-glandular; fruit not seen.

Cajamarca: Open jalca, southwest slope, Paso de Gavilán, S. of Cajamarca, alt. 3,100–3,300 m., *Pennell 14953*, type collection; Bushy ravine on jalca, southwest slope, Paso de Gavilán, S. of Cajamarca, alt. 3,100–3,200 m., *Pennell 14951*.—Ancash: Matahuanca, ca. 20 km. S. of Huaraz, alt. 4,000 m., *Rick s.n.*

Close to *C. inamoena* Kränzl. which differs in having the flowers in dichasia, much more deeply toothed or lobed leaves and very different indument.

Calceolaria hutchisonii Edwin, Phytologia 19: 383. 1970.

Erect, branched herb to 1.5 m. tall, stem drying red-brown, striate on upper part, closely puberulent above to sparsely so or almost glabrous below. Leaf blades very broadly ovate, sometimes to often wider than long, the longest up to 2.5 cm. long, mostly 0.8–2.0 cm. long, and 1.0–2.2 cm. wide, narrowed apically, very broadly obtuse basally, margins coarsely, irregularly crenate-dentate, teeth usually few, distant, densely and closely puberulent above, densely tomentulose-pulverulent beneath, drying dark-green above, much paler beneath, subcoriaceous, short-petiolate; petioles densely pubescent, up to 6.0 mm. long, thinly connate across the nodes; inflorescences paired, from the uppermost leaf-axils, usually in irregular, 1–2x branched, subcymose clusters; flower stalks short, often less than 1 cm. long, densely puberulent; bracts and bracteoles lacking; calyx lobes ovate, 4.0–4.5 mm. long, 3.0–3.5 mm. wide, acute to obtuse, densely closely puberulent on both surfaces, calyx tube puberulent; corolla yellow, densely papillose-glandular externally, 13–17 mm. long, upper lip annulate, 2–3 mm. long, lower lip saccate about half its length, internally proximally beset with long, white hair; stamens very small, filaments hardly 0.5 mm. long, anthers ca. 2.5 mm. long, cells equal, divergent, a little longer than wide; style 1.5–2.0 mm. long, very thickened on lower half, incurving to the upper lip from its base; ovary glandular; capsule not seen.

Piura: Huancabamba Prov., 18.5 km. above Huancabamba, on road W. to Piura, alt. 3,200 m., *Hutchison & Wright 6630*; El Tambo, road between Piura and Huancabamba, alt. ca. 3,000 m., *Scolnik 1407*; Above Huancabamba alt. 3,200–3,300 m., *Weberbauer 6048*.

The very short filaments, very broad leaves, compound inflorescences and very thickened style form a combination of characters not seen in any other species in the genus.

Calceolaria hyssopifolia HBK., Nov. Gen. et Sp. 2: 386. 1817. *C. linifolia* Willd. ex Link., in Spreng., Jahrb. 3: 54. 1820.

Erect, much branched, sometimes glutinous shrub, wood 4-angled, drying brown, foliage drying green-brown, externally glabrous except for puberulence on the branchlets and flower stalks. Leaves subsessile or almost so, lanceolate or linear-lanceolate (in ours), up to 8(–9) mm. wide, usually not exceeding 5 mm. long, margin entire, sometimes a little revolute, apex long-acute to acuminate, base usually acute, much darker above than beneath; petioles reaching 5 mm. long; inflorescences lax panicles; bracts leaf-like, reduced; calyx lobes narrowly ovate, acute, 2.0–3.5 mm. long and 1–2 mm. wide; corolla yellow, glabrous except for a tuft of hair internally at the base, upper lip much exceeding the calyx, 7–9 mm. long, lower lip 10–14 mm. long, saccate less than half its length; anther cells equal, broadly ovoid to subhemispherical, on very short filaments, up to ca. 1.2 mm. long; style 3 mm. long, ovary glabrous.

Amazonas: Approaches to Cerro Campanaria, NNE. of Diosan, Prov. Chachapoyas, alt. 3,200–3,500 m., *Wurdack 1591*.—Libertad: Moist bank, above Motil, shrub, alt. 3,000 m., *Pennell & Ferreyra 14838*.

This taxon has its main area of distribution in Ecuador. The Peruvian material tends to have slightly wider leaves and smaller flowers.

Calceolaria inamoena Kränzl. in Engler, Pflanzenr. 4(257c): 89. 1907.

Differing from *C. cuneiformis* R. & P. as in the key and in having smaller leaves that are pilose both above and beneath and finally in developing few-flowered dichasia at the apices of the branches.

Found from Arequipa, area of greatest concentration, N. to Junin and Lima.

Arequipa: S. slope of Chachani, north of Arequipa, *Hinkley* and *Hinkley 24*; Québrada de San Lazaro, near Arequipa, alt. 9,100 ft., *Munz. 15502*; Slopes of Chachani, alt. 3,600–3,700 m., *Pennell 13272*; Pampo de Arrieros, open rock-ledges, alt. 3,700–3,750 m., *Pennell 13334*; *Rose 18952*; Pichu-Pichu, among rocks on high banks, alt. 9,000 ft., *Stafford 817*; Prov. Arequipa, Jesús–Chiquata, alt. 2,800–3,000 m., *Vargas 8078*.—Junin: Between Viques and Ingahuasi, Mantaro Canyon S. of Huancayo, alt. 3,150 m., *Killip & Smith 22153*; Huancayo, *Soukup 3148*.—Lima: Prov. Cajatambo, stony ground near Oyon, alt. 3,400–3,500 m., *Ferreyra 3526*.

Calceolaria inaudita Kränzl. in Fedde, Rep. Sp. Nov. 1: 104. 1905.

Small, black-dotted shrub up to 1 m. tall, black glandular-pilose. Leaves very numerous, petiolate and sessile intermixed; petioles when present broader and attenuate at base, black-setose; blades obscurely trilobate, appearing globose due to the revolute margin, 1.0–1.5 mm. in diameter equally thickened; flowers terminal on the branches, forming few flowered corymbs; pedicels 2–3 cm. long, glandular-papillose, gemmiform; minute bracts present on the pedicels; calyx lobes densely glandular-villose on both surfaces, ovate, obtuse, 2–3 mm. long and 2 mm. wide; corolla yellow, lips subequal, about 1 cm. long and 6–7 mm. wide, upper lip margin little involute, lower saccate over most of its length; stamins short, anthers reniform. (After Kränzlin, 1907.)

No material seen. Reported from Ancash: Cordillera Negra above Caraz, alt. 4,200 m., *Weberbauer 3085*.

The text almost indicates a monstrous form of some other species.

Calceolaria incarum Kränzl. in Fedde., Rep. Sp. Nov. 1: 103. 1905.

Branched, glandular, erect shrub, stem and branches very densely brown-glandular, especially above. Leaves sometimes bullate or bullulate, oblong, with the short petiole up to 2.5 cm. long and up to 8 mm. wide, deeply round lobed and strongly revolute, often folded to the mid-vein, obtuse at apex and base, densely short-velvety tomentose above, glandular-pilose beneath, glands often red-brown when dry; petioles pubescent as the lower leaf surface; inflorescences many-flowered, irregularly corymbose, flowers densely disposed; flower stalks densely glandular, the pedicels usually less than 1 cm. long; calyx lobes oblong to ovate, externally and internally densely villose and sometimes glandular, 6–7 mm. long and 5 mm. wide at base; upper lip of the corolla a little shorter than the calyx, hooded, lower lip of the corolla 13–17 mm. long and about as wide, the suborbicular sac almost its entire length to about half its length, yellow, usually both internally and externally, sparsely glandular-pilose or -pilosulus, varying to almost glabrous, long, white glandular or eglandular hairs either present or absent around the orifice internally; filaments short, anther cells equal, contiguous, about 1.5 times longer than wide, each pair 1.5–3.5 cm. long, dehiscing through the septum; style thickened, a little longer than the

stamens; ovary glandular, capsule about as long as the calyx, narrowly oblong-subovoid, glandular, except at the base, topped by the persisting style.

Common in Dept. Ancash and thence north through Libertad to Cajamarca. This type of distributions is not unusual in the genus. As collecting continues other stations in Libertad and Cajamarca should be uncovered.

Ancash (selected from the wealth of collections): Fragments and photograph of type, Prov. Cajatambo, alt. 3,000–3,500 m., *Weberbauer 2762*; Prov. Bolognesi, Shincush above Chiquián, alt. 3,890 m., *Ferreyra 5827*; Between Tallenga and Pachapaque, 3,400–3,600 m., *Ferreyra 7470*; Chavanillo, alt. ca. 8,000 ft., *Macbride & Featherstone 1969*; Catuc, ca. 15 mi. E. of Huaraz, alt. ca. 10,500 ft., *Macbride & Featherstone 2509*; Jalca, Copa Grande, N. of Chancos, alt. 3,200–3,500 m., *Pennell 15363*; Stony Puna, S. slope of Paso de la Fortaléza, alt. 3,700 m., *Pennell 15394*; Open rocky limestone, above Chiquián, alt. 3,600–3,700 m., *Pennell 15418*; Dry rocky and sandy bed, Québrada de Huaqui, Huaraz, alt. 3,000–3,050 m., *Pennell 15431*; Jalca, slopes and meadows, Cerro San Cristobal, N. of Huaraz, alt. 3,450–3,600 m., *Pennell 15448*; Western slope of Cord. Negra, below Paso de Collán, alt. 3,650–3,800 m., *Pennell 15475*; Matahuanca, ca. 20 km. S. of Huaraz, alt. ca. 4,000 m., *Rick s.n.*—Cajamarca: Cumbre El Gavilán, road between Cajamarca and Chilete, alt. 3,200 m., *Ferreyra 3273*; *Pennell & Ferreyra 14961*; Limestone rocks, Llacanora, alt. 2,550–2,600 m., *Pennell 15487*.—Libertad: Lake Sausacocha, 10 km. N. of Huamachuco, alt. 3,000–3,200 m., *Ferreyra 3031*; *Pennell 14849*.

Calceolaria inflexa R. & P., Pl. Peruv. 1: 16, *t. 25a*. 1798.

Vine or lax shrub, well branched, stem and branches sparsely pilose, vesture occasionally very dense in the inflorescence, branches opposite. Leaves variable in shape and size, lance-ovate to ovate, up to 4 cm. long, usually not exceeding 3 cm. and up to 2 cm. wide, mostly 5–13 mm., sparsely pubescent or glabrous above, densely pulverulent beneath, both on the tissue and the thickened, prominent, elevated veins, entire to rarely serrulate or crenulate, often somewhat sinuate, acute at apex, narrowed to an usually acute or acutish base, short-petiolate; petioles up to 2–4 mm. long, pubescent, deeply grooved, thickened, thinly connate at least part way; flowers in panicles; the basal peduncle usually once branched, up to 2 cm. long, usually shorter; pedicels ca. half the length of peduncles, flower

stalks subglabrous to pubescent to occasionally densely glandular-pubescent; bracts leaf-like, little reduced in size; calyx lobes ovate, 4–6(–7) mm. long, acute, pubescent on both surfaces, margins thickened, a little revolute; corolla yellow, both lips pustulate-pubescent, from 13–30(–33) mm. long, upper lip little shorter to often longer than the calyx, ca. 5–7 mm. long; lower lip 20–28 mm. long, saccate most of its length, sac much inflated, abruptly upturned, with a tuft of white hairs at base internally; filaments short, anthers small, cells equal, notched at the apex of the septum; style short ca. 1–2 mm. long, densely beset with stalked glands at base; ovary densely covered with sessile glands.

This emended description combines the information presented in the text and picture of Ruiz and Pavon with the general run of specimens most nearly matching these data.

Leaves entire or sinuate; flower stalks eglandular, sparsely puberulent ..... *C. inflexa* f. *inflexa*.

Leaves serrulate-crenulate; flower stalks densely glandular-puberulent ..... *C. inflexa* f. *altissima*.

Calceolaria inflexa R. & P., f. **inflexa.** *C. laxa* Benth. in DC., Prodr. 10: 215. 1848.

Huanuco: Tambillo, 7 mi. SW of Panao, alt. ca. 8,000 ft., *Macbride 3580*; Huacachi near Muña, alt. ca. 6,500 ft., *Macbride 3888*; between Acamayo and Carpish, beside stream in semi-shade, alt. 8,500 ft., *Sandeman 5224*; Sariapampa, alt. 3,600 m., *Woytkowski 34322*.—Junin: 6 mi. S. of Mito, alt. ca. 10,000 ft., *Macbride & Featherstone 1838*; Pichis Trail, Dos de Mayo, dense forest, alt. 1,700–1,900 m., *Killip & Smith 25851*; Oxapampa *Soukup 2414*; 1,768 m. alt., *Soukup 3345*.

Also reported from Canta (Lima Dept.) and Sandia (Puno Dept.).

Calceolaria inflexa f. **altissima** (Kränzl.) Edwin, stat. nov. *C. altissima* Kränzl. in Engler, Pflanzenr. IV(257c): 107. 1907.

Sin. Dept.: Tambo de Vaca, alt. ca. 13,000 ft., *Macbride 4437*.

Originally described from Bolivia.

Calceolaria involuta R. & P., Fl. Peruv. 1: 15, *t.* 23*a*. 1798.

Tall, glutinous, branched shrub, branchlets drying shining brownish-purple, older wood brown, plant almost entirely glabrous on new wood, flower-stalks and calyces sparsely puberulent. Leaves petio-

late, blades lance-ovate, occasionally ovate, rarely lanceolate, mostly 4–8 cm. long and 1.5–3.0 cm. wide, dentate or serrate usually on upper three-fourths of the blade only, entire toward the acute to subobtuse base, acute or long-acute apically; petioles thickened, canaliculate, up to almost 2 cm. long, usually 1.0–1.5 cm. long; inflorescences terminal on the branches, paired, few-flowered dichasia or corymbs; calyx glabrous or the narrowly ovate lobes acute and sparsely puberulent externally, 6–8 mm. long, ca. 3.0–3.5 mm. wide at base; corolla yellow, glabrous externally or lower lip sparsely puberulent, upper lip about as long as the calyx lobes or little longer, lower ca. 12–15 mm. long, not 2 times longer than the upper lip, internally a tuft of hairs developed at the base or more often lacking, sac a little shorter than the non-saccate part; filaments short, anther cells unequal or less often equal, more than 2 times longer than wide, walls and septa thickened, each anther ca. 4.5 cm. long; style ca. 7 mm. long, apically curved, ovary puberulent; capsule not seen.

Libertad: Bombamarca, W. slope of eastern Cordillera, alt. 10,000 ft., *Carricker s.n.*, Sin. Loc: *Ruiz & Pavon s.n.*

Calceolaria lasiocalyx Pennell, Proc. Acad. Nat. Sci. Phila. 97: 168, *fig. 14b.* 1945.

Herbaceous at least on upper part of the plant, stems lax, branched, stem and branches pubescent with septate hair, pubescence glandless and sometimes reflexed. Leaves petiolate, lance-ovate, obtuse to subacute, upper 3–5 cm. long and 1.5–2.5 cm. wide, glandular-punctate above, densely to very densely pubescent above and beneath, crenate-dentate; petioles 6–7 mm. long, densely pubescent; inflorescences a pair of simple or once-branched cymes from the axils of the uppermost pair of leaves; peduncles up to 2.5–4.0 cm. long, pedicels abruptly much shorter, flower stalks septate-pubescent; bracts and bractlets usually lacking; calyx lobes ca. 5 mm. long, ovate, obtuse, pubescent externally; corolla yellow, externally, proximally or over its entire 10–13 mm. length finely glandular-pubescent (fide Pennell), upper lip 2–3 mm. long, lower lip 10–12 mm. long, saccate about half its length, with a tuft of white hairs internally at base; anthers 2.5–3.0 mm. long, cells equal, a little longer than wide, widely divergent; style ca. 1.5 mm. long, basally frequently glandular-puberulent; capsule ovoid-acute, glandular-puberulent, longer than the calyx.

Cuzco: Tío to Murayaca, Marcapata Valley, Prov. Quispicanchis, alt. 1,200 m., *Vargas 5199.*

The type *Vargas 3760* also collected in the Marcapata Valley.

Calceolaria leptantha Pennell, Proc. Acad. Nat. Sci. Phila. 97: 163. 1945.

Climbing or sprawling shrub, stem finely glandular-pubescent. Leaves on glandular-pubescent petioles that are mostly 12–20 mm. long, thickened at base and connate across the nodes; blades ovate, mostly 3–7 mm. long and 2.2–4.8 cm. wide, margins dentate, apex acute, base lightly cordate, tissue above pilose, beneath reticulate-veined, finely pubescent, especially on the veins and sparsely gland-dotted; inflorescences compound cymes; basal peduncles 5–8 cm. long; bracts petioled, reduced, leaf-like, but hardly cordate; intermediate peduncles and bractlets very reduced, all flower stalks glandular-pubescent; pedicels 15–35 mm. long; sepals glabrous, ovate, acute, entire to few-toothed, ciliolate, 3–7 mm. long; corolla yellow, externally essentially glabrous, upper lip ca. 2–3 mm. long, lower lip 15–28 mm. long, internally pubescent; anthers glabrous, cells equal, divaricate, from little longer than wide to almost twice as long; style ca. 1.5 mm. long, curved; capsule ovoid-conic, 6–7 mm. long, glandular-puberulent.

Cuzco: Near Río Paucartambo, below Paucartambo, alt. 2,900–3,200 m., *Pennell 13973* (type); Québrada de Llulluchayocc, alt. 3,100 m., *Vargas 4293*; 5 km. NE. of Paucartambo on road to Pillahuata, alt. 2,900 m., *Vargas* and *Ugent 4409*.

Calceolaria leucantha Edwin, Phytologia 19: 384. 1970.

Differing from *C. ballotifolia* Kränzl. to which it is very closely related in the following ways: wood and foliage glabrous, leaves 0.8–5.5 cm. long and 0.5–1.6 cm. wide, densely red-punctate beneath; lower lip of the corolla saccate only about a third its length.

Tall shrubby climber, glabrous except for the peduncles, pedicels and calyces, older wood unisulcate. Leaves ovate, very coarsely dentate, asymmetrical, acute at apex, obtuse to sometimes cordate at base, short-petiolate; inflorescences dichasiate or corymbose, few-flowered, terminal on the branches or in upper leaf axils; basal peduncles 3–5 times longer than the remaining flower stalks; calyx tube and the lower part of the lobes pubescent; corolla white, drying yellow.

Amazonas: above Colcamar, rocky stream in mountain forest, alt. 3,300 m., *Pennell 15634*.

Calceolaria linearioides Edwin, Phytologia 19: 385. 1970.

Shrub, erect or apically nodding, stems and branches densely puberulent or sometimes also glandular-puberulent. Leaves puberulent on both surfaces, more so beneath, blades short-petiolate, broadly linear or narrowly elliptically ovate, 1.0–2.5 cm. long and 4–8 mm. wide, margins few-serrulate on the upper half, often thinly revolute, apex acute or subacute, base acute or long-acute, venation visible, impressed above, elevated beneath; petioles ca. 1 mm. long, vesture as the blades, those of the stem and principal branches swollen and often with reduced leaves or abbreviated shoots in the axils; inflorescences racemose or true racemes, borne in upper leaf-axils; pedicels puberulent, ca. 1–2 cm. long; interfloral leaves reduced, otherwise as the cauline; calyx lobes sparsely puberulent on both surfaces or internally glabrous, broadly ovate, acute 4–5 mm. long, almost as wide near the base; corolla yellow, sometimes red marked within near the base, upper lip 2–3 mm. long, puberulent or papillose, lower lip glandular-puberulent beneath on the non-saccate proximal part or papillose beneath along its length, sometimes with a tuft of long white hairs at the base within, ca. 11–15 mm. long, saccate a little less than half its length; anthers large for the corolla, 4–5 mm. long, cells unequal, 2–3 times longer than wide, divaricate; style 2–3 mm. long, apically curved, ovary puberulent or sparsely glandular with fugitive glands; capsule ovoid, a little longer than the calyx, puberulent, narrowed to a long neck, apex obtuse.

Cajamarca: Dry banks (volcanic soil), alt. 2,900 m., 15–20 km. above Cajabamba, *Pennell & Ferreyra 14855*.—Pasco: Yanahuanca, northwestern slope, alt. ca. 10,000 ft., *Macbride & Featherstone 1184* (type).

Very close to *Calceolaria linearis* R. & P., differing only as in the key. The new species is proposed also because of the distance between the two collections, possibly indicating its wider occurrence in North Central Peru.

Calceolaria linearis R. & P., Fl. Peruv. 1: 19. 1798. *C. tenuifolia* Pennell, Proc. Phila. Acad. Nat. Sci. 97: 155. 1945.

Stems up to 10 dm. tall, branched and densely foliaceous, pubescence absent or when present variable. Leaves linear or narrowly lanceolate, minute to about 3 cm. long, from less than 1 mm. to about 3 mm. wide, margin revolute, entire, costa prominent beneath apex usually acute, often hirtellus or pulverulent or tomentose on one or both surfaces, occasionally glabrous; flowers in usually elon-

gate, dichasiate inflorescences, on the apices of the branches or axillary, occasionally solitary or in pairs; peduncles usually glutinous-pilose, apically bracteate; pedicels pilose; bractioles at apex of intermediate flower stalks; calyx segments broadly ovate, 4–5 mm. long and 3–4 mm. wide, obtuse, entire, pilose on both surfaces, often yellowish, even when dry; upper lip of the corolla minute, much shorter than the sepals, lower lip minutely pubescent, 10–15 mm. long, the sac more than half the length of the lip; anthers on very short, ca. 1.0–1.5 mm. filaments, cells usually unequal, less often subequal or equal, about 3 times longer than wide, divaricate; style very short ca. 1.0–2.0 mm. long, ovary glabrous or more often glandular-puberulent; capsule 4–7 mm. long and 2.0–3.5 mm. wide at base, usually glandular-puberulent, narrowly ovoid below with a long, abruptly narrowed upper part.

Citations selected from the copious material at most major herbaria.

Ancash: Above Chiquián, alt. 3,500–3,600 m., *Pennell 15417*; north of Chancos, alt. 3,250 m., *Pennell 15322*; toward El Huascaran, north of Yungay, alt. 2,850–2,900 m., *Pennell 15423*; Jalca slopes and meadow, Cerro San Cristobal, north of Huaraz, alt. 3,450–3,550 m., *Pennell 15449*.—Ayacucho: between Huanta and Hacienda Pagora, alt. 4,200 m., *Killip & Smith 23298*; Prov. Huamanga, alt. 3,500 m., *Weberbauer 5476*.—Cajamarca: Cerro Tinaya, alt. 3,150 m., *Ochoa 1688*; Along stream east of Cord. de Cumulloa, to Celendin, alt. 3,400 m., *Pennell 15160*; Thickets, mtn. north of Celendin, alt. 2,700–2,900 m., *Pennell 15206*; Ridge, rocky limestone, 11 km. south of Cajamarca, alt. 2,750–2,850 m., *Pennell & Anderson 15076*; 15–20 km. above Cajabamba, alt. 2,900 m., *Pennell & Ferreyra 14855*; 10 km. above Cajamarca, alt. 3,300 m., *Pennell & Ferreyra 14866*; 2–3 km. above Huamachucho, alt. 3,200 m., *Pennell & Ferreyra 14860*; West of Llacamora, chert hill, alt. 2,500–2,600 m., *Pennell & Ferreyra 14937*; Open jalca, Paso de Gavilán south of Cajamarca, alt. 3,100 m., *Pennell & Reichlin 15032*.—Cuzco: Jucay, *Soukup 854*.—Huancavelica; *Rauh-Hirsch 3473*; Huancavelica, alt. 3,798 m., *Soukup 2781*; Prov. Huancavelica, north of Huancavelica, calcareous rocks, alt. 3,700 m., *Stork & Horton 10827*; Bunbunya, cerro west of Conaica, alt. 3,680–3,700 m., *Tovar 210*.—Huancayo: Incahuasi, alt. 4,000 m., *Soukup 3158*.—Junin: Ocopa, alt. ca. 3,300 m., rocky stream bed, *Killip & Smith 21979*; Concepcíon, alt. 3,300 m., *Ochoa 733*; Huancayo, alt. 4,000 m., *Ledig 21*; Concepcíon, Huancayo, alt.

10,800 ft., *Sandeman 4918*; *Soukup 1981*.—La Libertad: Between Trujillo and Huamachuco, alt. 2,900–3,300 m., *Ferreyra 3013*; Otuzco, Agallpampa, alt. 3,270 m., *Lopez 0328*; S. of Otuzco, alt. 2,500 m., *Pennell & Ferreyra 14820*; km. 82, west of and below Agallpampa, alt. 2,900 m., *Pennell & Ferreyra 14831*; *14832*; above Motil, alt. 3,200 m., *Pennell & Ferreyra 14881*; Santiago de Chuco: above Cachicadon, alt. 2,800 m., *Stork & Horton 9974*.—Sin. Dept.: Concepcíon: Ingenio, *Soukup 3670*.—Sin. Loc. *Ruiz & Pavon s.n.*

Calceolaria lobata Cav., Icon. 5: 26, *t. 443, f. 1*. 1799.

Subshrub, stems ascending, woody at base with vesture of stalked, red glands, internodes from much longer to shorter than the leaves, stems usually few-branched, branches thin. Leaves long-petiolate, very broadly ovate in outline, base cordate to less often truncate, usually 7-lobed, occasionally 5- or 9-lobed, lobes irregularly dentate, apical lobe acute, size very variable from about 1 to 10 cm. long and almost as wide, usually densely pilose on both surfaces; petioles mostly 1–5 cm. long, on the largest leaves even longer, frequently from half to as long as the blade; inflorescences on long basal peduncles, these often up to 10 cm. or more and frequently aphyllous except at their summit where a pair of leaf-like bracts are produced, corymbose, few- to many-flowered; peduncles, pedicels, calyces and ovaries densely glandular-pilose; calyx lobes ovate, 4–6 mm. long and 3.5–4.5 mm. wide; corolla yellow, usually purple marked internally, upper lip of the corolla much shorter than the calyx lobes, lower lip ca. 14–18 mm. long, saccate less than half its length, distally upturned; filaments exceeding the lower lip, anther cells equal, apically fused and diverging to the base, each pair of cells sagittate or almost so, large for the corolla orifice; style ca. 2 mm. long; capsule ovate to broadly ovate, abruptly narrowed to a long neck, glandular-puberulent, a little longer than the calyx, drying violet-red.

Ancash: Rocky wall, Paso de Fortaléza, alt. 3,700 m., *Pennell 15262*; Alt. 3,800–3,850 m., *Pennell 15390*; *15391*; above Chiquián, alt. 3,500–3,600 m., *Pennell 15416*; W. slope of Cerro Negra, below Paso de Collán, *Pennell 15480*; Ocros, alt. 3,200 m., *Weberbauer 5804*.—Arequipa: Québrada de San Lazaro, above Arequipa, alt. 9,800 ft., *Munz 15516*; Volcan de Misti, base of volcano, rocky wall of canyon, canyon, alt. 3,300–3,400 m., *Pennell 13226*; *14273*; Picchu-picchu, near moisture, alt. 10,500 ft., *Sandeman 4015*; Alt. 12,000 ft., *Stafford 669*; Chachani, amongst rocks in deep ravine, alt. 11,000 ft.,

Stafford 596; Chivay, alt. 3,900 m., *Weberbauer 6890*.—Ayacucho: Puquio-Valley, alt. 3,400 m., *Rauh–Hirsch P439*.—Junin: Prov. Tarma, rocky ground between Tarma and La Oroya, alt. 3,600–3,700 m., *Ferreyra 3830*.—Lima: Prov. Huarochiri, Chicla, steep stony slope, alt. 3,700 m., *Asplund 11249*; Stony ground near Casapalca, between San Mateo and Matucana, *Ferreyra 3947*; Río Blanco, alt. 3,000–3,500 m., open hillside, *Killip & Smith 21651*; *21711*; *21731*; Río Blanco, bunch grass, stony slopes, about 15,000 ft., *Macbride 2976*; Alt. 12,000 ft., leaning against rock faces, *Macbride & Featherstone 708*; near Antaicocha, Cerro Colorado, E. of Canta, alt. 3,500–4,000 m., *Pennell 14625*; Huaros, rock ledges on open slope, alt. 3,500–3,600 m., *Pennell 14738*; Rocky bank above Río Blanco, alt. 3,500–3,700 m., *Pennell & Maldonado 15937*; Río Blanco–Casapalca, alt. 3,600–4,000 m., *Vargas 5265*.—Moquegua: Saylapa near Carumas, humid rocks, alt. 3,500 m., *Weberbauer 7342*.

Calceolaria longiinternodia Edwin, Phytologia 19: 386. 1970.

Tall herb, branching near the apex, branches swollen at base, nodes, especially the lower, several times (ca. 4–5) longer than the largest leaves, stems drying dark- to purple-brown, striatulate, mostly glabrous except hirsute-puberulent in the inflorescence. Leaves opposite or ternate, blades narrowly ovate to lance-ovate, densely tomentose and pale-green beneath, glabrous, darker and dull-green above, very variable in size, the major leaves 4–6 cm. long and usually 1.5–3.0 cm. wide, margins very coarsely dentate, apex long-acute, variable at base; petioles up to 6 mm. long, densely tomentose, often with abbreviated shoots or reduced leaves at base in the axils; peduncles and pedicels densely tomentose, the longest peduncles ca. 4.5 cm. long, once or twice branching, forming dichasia, pedicels about half as long or less than half as long as the peduncles; inflorescences on upper part of the stem, terminal on the branches; calyx lobes broadly ovate, 7–9(–10) mm. long, acute, entire, externally densely puberulent, internally puberulent with a row of hairs near the margin; corolla yellow, 25–30 mm. long, lower lip externally pustulate, internally with a tuft of hair at the base, upper lip ca. 4–6 mm. long, lower lip 21–24 mm. long, saccate less than half its length; anthers on short filaments, cells equal or a little unequal, sometimes dimorphic in a flower, mostly at least 2 times longer than wide, less often only little longer than wide to almost as wide as long, each pair of cells 4.5–5.5 mm. long; style a little thickened, erect, ca. 4 mm. long, ovary glandular.

Ancash: Herb, banks near stream Tinco, alt. 3,400–3,650 m., E. slope of Cordillera Negra opposite Huaraz, *Pennell 15468* (type).

Close to *C. impressifolia* Edwin, from which it differs in leaf and anther shape and *C. hirsutula* Pennell and *C. bicrenata* R. & P. The former has leaf margins with very fine teeth and the latter differs in leaf-shape. *C. longiinternodia* differs from all other Calceolarias in the combination of dimorphic anthers, leaves about three times as long as wide with coarsely dentate margins and calyx lobes usually 7–9 mm. long with a distinct row of hairs internally near the margins.

Calceolaria lopezii Edwin, Phytologia 19: 387. 1970.

Soft erect herb, branches and leaves opposite, stems, branches and flower-stalks more or less densely pubescent with gland-tipped hairs, glands small and frequently fugitive in age, hairs white of intermixed, varying sizes, upper nodes bearing densest vesture. Uppermost leaves sessile, others short-petiolate, blades ovate, mostly 2.8–4.1 cm. long, sometimes shorter, and 2.0–3.8(–4.4) cm. wide, sometimes narrower, dentate-denticulate, apex acute, base obtuse to truncate, occasionally cordate, subglabrous to sparsely puberulent with 2-celled hairs, mostly concentrated on the margins and the veins above, chartaceous, a little paler beneath than above, both surfaces dull green; petioles only 1–2 mm. long, rarely a little longer, vesture denser than the blades; inflorescences terminal on stem and axillary or terminal on the branches with a pair of reduced bract-like leaves at the base of the peduncle, simple or lax branched dichasia; calyx lobes externally sparsely pubescent, margins ciliate, internally glabrous, main veins parallel, ovate to elliptical, 2.3–3.0 mm. long and 1.2–2.0 mm. wide, acute; corolla yellow, 12–22 mm. long, almost completely glabrous, upper lip more than half the length of the lower, 7–8 mm. long, lower lip 11–13 mm. long and 7–9 mm. wide, saccate about half its length; filaments about 4 mm. long, flattened, with one main vein, anthers bilocular, locules very small, each anther about 1 mm. long, usually smaller, a little longer than wide; style glabrous, elongate, 4.5–5.0 mm. long, glabrous, thin, stigma very small, scarcely wider than the style, ovary drying dark red; capsule not seen.

Libertad: Cerro Campana, Prov. Trujillo, alt. 500 m., Aug. 9, 1948, *Lopez 0221* (US); same location August 21, 1949, alt. 420 m., *Angulo 0698*.

Calceolaria luteocalyx Edwin, Phytologia 19: 388. 1970.

Climbing shrub, main branches and stem canaliculate at least part way, young wood densely, older wood sparsely puberulent.

Leaves petiolate, blades ovate or elliptic-ovate, mostly 2.0–4.0 cm. long and 1.5–2.2 cm. wide, usually not twice as long as wide, narrowed at both ends, margins coarsely, irregularly serrate-dentate; petioles densely pubescent, mostly 0.8–1.8 cm. long, basally little thickened and thinly connate across the nodes that are frequently much longer than the leaves; inflorescences arising from the upper leaf-axils, basally dichotomously branched, ultimately 3-flowered cymes, basal branching sometimes wanting, then the inflorescences simple or once-branched cymes; bracts and bractlets foliose, reduced; basal peduncles 5–9 cm. long, secondary peduncles ca. a half to two-thirds as long as the basal; pedicels little shorter than secondary peduncles; flower stalks densely puberulent; calyx yellow, lobes subglabrous, sometimes broader than long, broadly ovate, obtuse, 7–8 mm. long and 7–9 mm. wide, margins sinuate or irregularly broadly crenulate and sparsely ciliolate, calyx tube sparsely to densely puberulent; corolla yellow, wholly glabrous, upper lip 3 mm. long with hood 1 mm. long; lower lip 18–22 mm. long, saccate less than half its length, proximal, non-saccate part only little narrower than distally; anther cells equal, ca. 2 mm. long, divaricate, subsessile, filaments ca. 0.3–0.5 mm. long and about as wide; style ca. 2.5–3.0 mm. long, thickened, ovary pubescent, flattened; capsule not seen.

Known only from the type collection.

Amazonas: Forest, alt. 3,000 m., Cerro Puma-urco, SE. of Chachapoyas, *Pennell 15549* (PH).

This species differs from all other taxa in the genus by virtue of the following combination of characteristics: calyx yellow, with lobes often wider than long, non-saccate part of the lower lip of the corolla only little narrower than the saccate part and the anthers subsessile.

Calceolaria macrocarpa Pennell, Proc. Acad. Nat. Sci. Phila. 97: 161. 1945.

Branched shrub forming clumps, stems scabrous. Leaves short-petiolate, elliptical, 1.5–2.0 cm. long and 0.8–1.0 cm. wide, acute, dentate, with about 5 pairs of sharp teeth, pilose above, puberulent and gland-dotted beneath, base cuneate; petioles 3–4 mm. long, basally thickened; inflorescences in pairs of 1–3-flowered cymes; peduncles 2.5–4.5 cm. long; bracts reduced foliage leaves; pedicels 9–13 mm. long; flower stalks finely scabrous; sepals ovate to lance-ovate, acute, 7–8 mm. long, minutely scabrous; corolla yellow, externally proximally puberulent, upper lip 1.5–2.5 mm. long, lower lip

ca. 20 mm. long, internally glabrous, sac less than half its length; anther cells equally divaricate, ca. 2 mm. long, about two-thirds as wide as long; style 1.2 mm. long, curved apically; capsule narrowly conic, 10 mm. long, obsoletely glandular-pubescent.

Cuzco: Checacupe, open rocky bank, alt. 3,400–3,450 m., *Pennell 13535* (type); *Cook & Gilbert 93* pp., from Sicuani reported by Pennell but unknown to me.

Calceolaria maculata Edwin, Phytologia 19: 389. 1970.

Climbing herb with opposite branches, young stems and branches densely pubescent, older densely puberulent, internodes longer than the leaves. Leaves short-petiolate, densely eglandular, ferrugineous-tomentose beneath, densely pubescent above with shorter, frequently glandular hairs, ovate, grossly dentate, apex acute, base broadly obtuse to subtruncate, mostly 1.8–3.0 cm. long and 1.0–1.9 cm. wide; petioles up to ca. 8 mm. long, densely pubescent, those of the stem leaves thick, indurate, woody, persistent, with the branches forming swollen nodes; flowers clustered at the apices of the upper branches in irregular cymose or corymbose inflorescences; bracts and flower stalks densely pubescent; basal peduncles up to 3 cm. long, intermediate peduncles and pedicels much shorter, frequently less than half as long; calyx lobes ovate, acute, 5.0–6.5 mm. long, almost as wide at base, externally densely pubescent, internally with a thick row of short hairs along the margins and a few, scattered hairs on the lower third; corolla yellow, the internal surface of the lower lip red-brown marked or spotted and with a tuft of long white hairs at the base, mostly 19–23 mm. long, less than half as wide, upper lip up to 2.5 mm. long, lower lip beneath, externally sparsely puberulent, 16.5–22.0 mm. long, saccate only about a third to a fourth its length, the sac at the distal end with 2 short sulcations therefore appearing 3-lobate; stamens glabrous, filaments ca. 1.5 mm. long, anthers ca. 3 mm. long, cells equal, almost twice as long as wide; style 1.5–2.0 mm. long, erect or little curved at apex, glabrous, most often thickened, ovary glandular with sessile, golden glands; capsule ovoid, obtuse, glandular, shorter than the calyx.

Known only from the type collection.

Cajamarca: Meadow, E. of Celendin, alt. 2,500–2,700 m., *Pennell 15215* (US).

This very distinct taxon is probably close to *C. aperta* Edwin, but easily distinguished from it. The corolla is very unusual.

Calceolaria micrantha Pennell, Proc. Acad. Nat. Sci. Phila. 97: 176–177. 1945.

Annual, mostly glandular-pubescent herb, up to 30–40 cm. tall, stem glabrescent near the base, internodes usually longer than the leaves. Lower leaves ovate in outline, 1.5–2.7 cm. long and almost as wide, usually pinnatifid or with 2 pairs of pinnae, on petioles 1.5–2.0 cm. long, upper leaves and bracts lanceolate, about 1.5 cm. long and 3–6 mm. wide, on petioles about 5 mm. long; petioles connate across the nodes; inflorescences compound, one-sided cymes; pedicels reduced apically, 2–20 mm. long; basal peduncles 35–50 mm. long; sepals ovate, 4–5 mm. long, acute to acuminate, irregularly sparsely denticulate, ciliate, externally with gland-tipped pubescence; corolla yellow, externally glabrous, upper lip 2–3 mm. long, lower 5–8 mm. long, saccate most of its length; connective thickened, longer than the sterile lower anther, shorter than the fertile upper anther; style glabrous 1.0–1.5 mm. long; capsule about as long as the calyx, ovoid, constricted to the conic neck, glandular-puberulent.

Ayacucho: Ccarrapa, between Huanta and Río Apurimac, alt. ca. 1,500 m., *Killip & Smith 22381*.—Cuzco: Near Río Yanamayo, below "Pillahuata," alt. 2,200–2,400 m., *Pennell* (type).

This is a forest species of southern Peru which probably has greater distribution than the two collections indicate. It is inconspicuous and easily overlooked.

Calceolaria millefoliata Kränzl. in Engler, Bot. Jahrb. 50: Beibl. 111, 72. 1914.

Much branched, erect shrub, bark glabrescent below and glandular-pilose above. Leaves very numerous, petiolate, blades up to 5 mm. long and 4 mm. wide, margin with 5–7 obtuse lobes and a little revolute, densely white-pilose above and beneath, the hairs curly and loosely matted; petioles up to almost 1.5 mm. long, reddish; flowers solitary or in few-flowered dichasia at the apices of stems and principal branches; flower stalks thin, densely pilose, 1.0–2.5 cm. long; calyx lobes ovate, 4.0–5.0 mm. long and 2 mm. wide at base, acute; corolla orange-red, entirely glabrous, 1.5 mm. long and 1.0 cm. wide distally, upper lip 3 mm. long, hooded, lower lip 1.2 cm. long, saccate more than half its length, the transverse orifice 2 times as wide as long; filaments very short, anthers ca. 2 mm. long, up to almost 2 times longer than wide; style about as long as the stamens; ovary papillose. (Description after Kränzl.)

Only two collections seen, the type material from the department of Ayacucho and the other from Arequipa. The distance between collections, about 350–400 km., indicates strongly that future specimens will be found in the area now separating them.

Arequipa: Rocky canyon above Arequipa, alt. 3,300 m., *Pennell 13212*.—Ayacucho: between Río de Lomas and Río de Yanca in Prov. Parinacochas, alt. 2,900–3,000 m., *Weberbauer 5770*.

Calceolaria myriophylla Kränzl. in Engler, Pflanzenr. 4(257c): 88. 1907.

Shrub, much branched, branches thin often curved, older wood glabrous, light or dark grey, younger densely white-tomentose. Leaves minute, very numerous, short-petiolate, ovate and oblong, mostly up to 5 mm. long and 3 mm. wide, occasionally reaching almost 10 mm. long and 6 mm. wide, margin plane or little revolute, entire or sometimes crenulate-crenate, minutely white-pilose with impressed nervation above, long-white-pilose with prominent nervation beneath, apically obtuse; inflorescences of 3-flowered dichasia or flowers solitary in upper leaf-axils, dichasia sometimes crowded; pedicels thin, ca. 1.0 cm. long, sometimes shorter or longer and with the calyces minutely papillose; bracts minute; calyx 4.5–6.0 mm. long, pubescent, lobes ovate, 3.5–4.5 (5.0) mm. long, 3.5–4.0 mm. wide, puberulent on both sides, obtusish; corolla yellow, minutely pilose or glabrous, mostly 2.0–2.8 cm. long, upper lip shorter than the calyx, lower saccate less than half its length, orifice rectangular; filaments 1.5–2.5 mm. long, anther cells equal, up to 2 times longer than wide, variable in size, usually large for the corolla, divaricate; style short, ovary glabrous or usually sparsely glandular, drying shining, red-black; capsule glandular or glabrous, longer than the calyx and filling it tightly, spherical or very broadly ovoid with a long-acuminate beak.

Well represented in Dept. Cuzco, unknown elsewhere.

Cuzco: Rocky slope, alt. 3,300 m., *Cardenas 4186*; Ollantaitambo, alt. ca. 3,000 m., *Cook & Gilbert 377, 496, 627*; "Puru-puru," Río Japfi, alt. 3,500–3,600 m., *Herrera 776*; "Pulu-pulu," Huasco, alt. 3,200 m., *Herrera 3032*; Cusipata, alt. 3,300 m., *Pennell 13537*; Sacsahuamán, alt. 3,500–3,600 m., *Pennell 13569, 13588*; San Sebastian, alt. 3,300–3,400 m., *Pennell 13597*; Ollantaitambo, alt. 3,100–3,300 m., *Pennell 13676*: Pisac, rocky canyon, alt. 3,400–3,500 m., *Pennell 13720*; Qurquijana, alt. 3,200 m., *Pennell 14208*; Sajsaihuamán, alt. 3,600 m., *Vargas 229*; Sin Loc., *Watkins s.n.*

Calceolaria myrtilloides Kränzl. in Fedde, Rep. Spec. Nov. 1: 99. 1905.

Erect essentially glabrous shrub, wood frequently drying black or dark brown. Leaves short-petiolate, ovate or elliptic-ovate, mostly 1.5–3.0 cm. long and 1.2–2.2 cm. wide, dark green with obscure venation above, light yellow-green with obvious, reticulate venation beneath, obscurely dentate-serrate, narrowed to both ends; petioles ca. 3–6 mm. long; inflorescences few-flowered, corymbose; flower-stalks minutely papillose; bracteoles lanceolate or lance-ovate; calyx lobes ovate, acute, 5.0–7.5 mm. long, externally glabrous, internally with a row of hairs along the margins and with scattered puberulence; corolla yellow, variable in size, glandular-puberulent or -pilose or occasionally only very sparsely so, upper lip from 3 mm. long to only little shorter than the calyx lobes, lower lip from 20–30 mm. long, sac round, more than half the length of the lip; anther cells equal or unequal, at least twice as long as wide, each pair of cells divaricate, 3.5–4.5 (–5.0) mm. long, filaments short, thickened, especially at the base; styles abruptly incurved, ca. 2.3 mm. long, ovary densely glandular-pubescent.

Ancash: Near Shincash above Chiquian, Prov. Bolognesi, alt. 3,885 m., *Ferreyra 5848*; Between Tallenga and Pachapaque, Bolognesi, alt. 3,500–3,600 m., *Ferreyra 7477*; Near Ocros, Prov. Cajatambo, alt. 3,500–3,700 m., *Weberbauer 2689* (fragment of type).—Libertad: Toyabamba, alt. 10,000–12,000 ft., *Carricker s.n.*

Calceolaria nivalis HBK., Nov. Gen. et Sp. 2: 381. 1817.

Shrub, essentially glabrous, stems, branches and upper surface of the leaves shining, even when dry, plants frequently glutinous. Leaves short-petiolate, blades ovate or lance-ovate, rarely almost lanceolate, subcoriaceous, largest up to 6 cm. long and 2 cm. wide, margin dentate-serrate, apex acute, narrowed to base, obviously reticulate-venose beneath; petioles 4–6 mm. long; inflorescences cymose-subumbellate, up to 10-flowered, usually less; pedicels black-hirtellus, rarely elongate; calyx lobes ovate, acute, 5–6 mm. long and 3–4 mm. wide, sparsely glandular-pubescent externally, most often with a row of yellow hair internally along the margin; corolla yellow, glabrous, upper lip longer than the calyx, ca. 7–8 mm. long, lower lip up to 12 mm. long, saccate less than half its length; filaments very short, anther cells equal, little longer than wide, longer than the filament.

Reported (by Kränzlin) in Peru. No material seen. The report may be erroneous. This species is well collected in Ecuador.

Calceolaria oblonga R. & P., Fl. Peruv. 1: 15, *t. 24, fig. b.* 1798. *C. punicea* R. & P. lc. *t. 24, fig. a.*

Herb, sometimes woody at base, leaves, especially on the veins beneath, calyx lobe margins and often also the stems and branches beset with multicellular hair. Leaf blades very short-petiolate, petioles up to 4 mm. long, densely pubescent, blades ovate, acute at apex, obtuse or subobtuse at base, irregularly serrate-serrulate; inflorescences usually paired, from the axils of the uppermost leaves, few-flowered, corymbose or dichasiate (ex desc.); flower stalks densely pubescent with multicellular hair, basal peduncles 3–4 times longer than the remaining peduncles and pedicels; interfloral leaves much reduced; flowers small, 12–18 mm. long; calyx lobes, margins excepted, externally, sparsely pubescent, internally glabrous, ovate, acute, 3.5–4.0 mm. long and 2.5–3.0 mm. wide, veins obvious within; corolla yellow to pale yellow, upper lip sometimes almost white, 4.5–6.5 mm. long, hood very short, externally glandular-pubescent, orifice internally surrounded by a tuft of long, white hairs, lower lip more or less densely pubescent externally with short, gland-tipped hairs, 7–12 mm. long, from little more to little less than twice as long as the upper lip, saccate over most of its length; anthers very short-stalked, locules equal, divaricate, each pair 2.0–2.5 mm. long, only little longer than wide; style very short, ca. 1.0–1.3 mm. long, thickened, erect, ovary pustulate-glandular.

Cuzco: Valley of Cosñipata, between Mistiana and Deros, alt. ca. 800 m., *Scolnik 889.*—Junin: Pichis Trail, Porvenir, alt. 1,500–1,900 m., dense forest, *Killip & Smith 25952.*

The distance between collections of this distinct species indicates its occurrence in the area between and possibly even beyond them.

Calceolaria padifolia HBK., Nov. Gen. et Sp. 2: 380. 1817. *C. deflexa* Willd. ex Link in Spreng., Bot. Jahrb. 1(3): 52. 1820.

Slightly glutinous, branchlets excepted, erect, much branched shrub. Leaves on petioles 5–10 mm. long, subconnate (ex Kunth, pilose in the canal); blades ovate-lanceolate, base rounded or short-acute, apex acute and acuminate, dentate, reticulate-venose and paler beneath than above, up to 6 cm. long and 2 cm. wide; inflorescences subdichasiate, basally equally 3-branched, the ultimate branching dichasial; pedicels about 2 cm. long, all flower stalks thin; calyx segments ovate, obtuse, 6 mm. long and 3 mm. wide at base; corolla yellow, glabrous, upper lip longer than the calyx, 1 cm. long; lower

lip 1.2 cm. long; stamens very short, anthers much larger than the filaments. (Description after Kränzlin.)

Reported from Piura: Ayavaca (Ayabaca) *Humboldt & Bonpland 3586*; photo seen.

Calceolaria pallascensis Edwin, Phytologia 19: 390. 1970.

Erect, strictly branching from about the middle, mostly densely white-lanate, nodose shrub, stems very densely lanate above, vesture decreasing basally, thickened at the closely spaced nodes. Leaves a little shorter to a little longer than the internodes, with the branches and flower stalks strictly pointing upward, almost parallel to the main stem, sessile, linear or aciculiform, mostly 0.5–1.5 cm. long up to 2 mm. wide, densely lanate in the groove of the costa and varying to densely puberulent-pustulate on the tissue, the puberulence minutely gland-tipped, the bases of the outermost leaves at each node thickened, mostly with very abbreviated shoots in the axils, the leaves appearing clustered, occasionally the shoots a little elongated, margins revolute, entire, apex hammate, tissue thickened, venation obsolete; inflorescences terminal on the main stem and branches and in the uppermost leaf-axils, simply cymose; pedicels 5–10 mm. long, densely lanate; calyx tissue thickened, calyx lobes externally densely lanate, internally glabrous or minutely glandular-puberulent, or with a line of hairs near the margin, 3 segments broadly ovate, the fourth segment elliptically ovate, 4.0–4.5 mm. long and ca. 3.0 mm. wide or 5.0–5.5 mm. long and 2.0 mm. wide, all acute; corolla yellow, glabrous or often minutely puberulent, 7–11 mm. long, upper lip 3–4 mm. long, hooded but not obscuring the genitalia, lower lip saccate about half its length, sac distally crenulate, internally glabrous; anther cells large for the corolla on very short filaments, divaricate, unequal and almost oribicular; style 2.5–4.5 mm. long, curved, ovary granular; fruit not seen.

Known only from the type.

Ancash: Laguna de Pelagatos, Prov. Pallasca, alt. 4,300 m., *Lopez 2400* (LA).

Unequal almost orbicular anther cells are rare in the genus. This characteristic along with the strict branching, strict flower stalks, very small corolla, simple inflorescence, dense woolly vesture and very narrow leaves aggregated in nodose masses renders the taxon quite distinct.

Calceolaria palustris Sodiro ex Kränzl. Pflanzenr. 4(257c): 27. 1907.

Repent to ascending annual herb, upper half of the stems usually glandular-pubescent, becoming glabrous below, pubescence several celled. Leaves variable, uppermost lanceolate, acute, few-dentate, dentations deep, large acute, becoming pinnatifid to pinnate below and ovate in inclusive outline, subglabrous to sparsely pubescent above, puberulent beneath, sometimes only on the costa, lowest leaves largest, up to 4 cm. long and 2.5 cm. wide, decreasing in size to the apex of the stems; petioles flattened, mostly 1–2 cm. long, those of the largest leaves very thinly connate across the stem; flowers borne singly in the axils of the upper leaves; the appressed-glandular-pubescent pedicels shorter to longer than the subtending leaves; calyx lobes lance-ovate to occasionally ovate, acute, denticulate, 6–8 mm. long and 2.5–4.0 mm. wide, glandular-puberulent on the margins, venation externally prominent; corolla pale yellow, upper lip 3–5 mm. long, lower lip occasionally drying creamy white, externally glabrous, 8–15 mm. long, saccate most of its length; calyx and corolla often purple-maculate; connective longer than the anther cells, upper fertile, almost globular, lower cell sterile, rudimentary; style ca. 1.0 mm. long; capsule as long as wide or more often wider than long, 4 mm. long and 4–6 mm. wide, broadly ovoid, shorter than the calyx, glabrous.

Cuzco: Near Río Yanamayo, below "Pillahuata," alt. 2,000–2,300 m., *Pennell 14044*; Prov. Paucartambo, Tambomayo, alt. 1,300 m., *Vargas 7288*.—Huanuco: Prov. Huanuco, Carpish, alt. ca. 2,750 m., *Asplund 12847*; Cordillera Azul, alt. 1,600 m., *Scolnik 1113*.—Puno: Prov. Sandia, Limbani, alt. 3,300 m., *Vargas 9636*.

Distributed from Colombia to Bolivia.

Calceolaria pavonii Benth., in DC., Prodr. 10:211. 1846. *C. perfoliata* R. & P., Fl. Peruv. 1: 15, *t. 210*. 1798, non L.f.

Erect, perennial, viscose-villose or viscose-puberulent herb. Petioles winged, dilated at base, connate, subdentate; leaf tissue not obscured by the vesture. Otherwise much like *C. tomentosa* R. & P. with which it may be conspecific.

Amazonas: Prov. Chachapoyas: near Leimebamba, alt. 3,000 m., moist open clay soil (Cerro Calla-Calla?), *Metcalf 30797*; Ridge southeast of Colcamar, alt. 2,100–2,200 m., *Pennell 15595*; *15600*; Above Colcamar, alt. 2,500 m., *Pennell 15607*; *Mathews 3042*.—Huanuco:

El Tambillo, camino a Panáo, alt. 2,650 m., *Scolnik 1053*; Several km. west of summit of Carpish, alt. 2,800 m., *Stork & Horton 9899*. —Junin: Huancapistana, thickets and open woods, alt. 1,800–2,400 m., *Killip & Smith 24179*; Prov. Tarma: Aqua Dulce, alt. 2,000 m., *Woytkowski 37008*.—Piura: Porculla, alt. 6,000–7,000 ft., *Carricker s.n.*—Sin. Dept.: Yanano, alt. 6,000 ft., *Macbride 4923*.—Sin. Loc.: *Ruiz & Pavon s.n.*

Calceolaria pearceana Kränzl. Pflanzenr. 4(257C): 107. 1907.

Vine or climbing shrub, occasionally a climbing perennial herb, stem, branches and flower stalks usually brown-puberulent, puberulence decreasing with age, main stem ultimately frequently glabrate near the base. Leaves small for the plant, sessile or almost so, ovate, reaching 2.5 cm. long and 1 cm. wide, mostly smaller, especially in width, crenate, acute at apex, acute to cuneate at base, puberulent or pilose on both surfaces or glabrous above, sometimes few-gold-punctate beneath; inflorescences of few-flowered corymbs, terminal on the branches; flower stalks thin, up to 2 cm. long; calyx lobes ovate, 6 mm. long, acute, puberulent externally, few-gold-punctate internally and often with a row of golden hairs along the margins; corolla 14–20 mm. long, sparsely muricate with red puncticulations and golden puncta, upper lip well developed, sometimes exceeding the calyx, usually more than half as long as the calyx, yellow or whitish, lower lip yellow, saccate more or less than half its length; filaments short, anther cells drying black or brown, equal, walls thickened, divergent to subsagittate, large for the corolla, less than twice as long as wide to little longer than wide; style 4–6 mm. long, little or not at all thickened, with the ovary, glandular punctate at base; capsule ovate, when immature shorter than the explanate calyx.

Cuzco: Paucartambo to Trés Cruces, Cerro de Cusilluyoc, thickets, alt. 3,400–3,700 m., *Pennell 13803*; "Pillahuata," Cerro de Cusilluyoc, thickets above town, alt. 3,000–3,500 m., *Pennell 13928*; forests above "Pillahuata," alt. 2,200–2,600 m., *Pennell 13930*; among shrubs near Marcachea, Prov. Paucartambo, alt. 2,450 m., *Vargas 11174*.—Puno: Sandia, near Limbani, alt. 3,200–3,450 m., *Metcalf 30481*; Sin. Loc.: *Soukup 1228*, no data.

The small corolla enables rapid separation of this taxon from its near relatives, such as *C. boliviana* and *C. atahualpae*. Explanate fruiting calyces are rare in the genus.

Calceolaria phaceliaefolia Edwin, Phytologia 19: 390. 1970.

Subshrub dying back to near the ground or occasionally an herb or small shrub, usually branching over much of its length, younger stems puberulent, often with mixed glandular and eglandular hair, older at length glabrate. Leaves petiolate, ovate in outline, very variable in size, mostly 1–3 cm. long and 0.8–2.5 cm. wide, in herbaceous material up to 6 cm. long and 5 cm. wide, margins with 2–4 pairs of irregular lobes, these sometimes secondarily toothed, long-acute at apex, obtuse to subtruncate at base, puberulent above and beneath with gland-tipped hairs; petioles sometimes almost as long as the blades, most often a third to a fourth the length of the blades, glandular-puberulent to -pubescent; inflorescences variable, corymbose to paniculate, when paniculate, the ultimate branchings cymose or dichasiate, few- to many-flowered, usually terminal on the branches; bractlets very reduced, leaf-like, ca. 0.5 mm. long, lobes short, 1–2 pairs; basal peduncles 3–10 times longer than the remaining flower stalks, peduncles and pedicels gland-tipped-puberulent, sometimes densely so; flowers variable in size, 22–40 mm. long when dry, up to only half as wide; calyx lobes ovate, acute, 7–9 mm. long and 4–6 mm. wide, internally and externally gland-tipped puberulent; corolla yellow, 20–35 (–38) mm. long, externally sparsely to densely very short-puberulent, the hairs gland-tipped, upper lip very short, ca. 2–4 mm. long, not hiding the stamens and stigma; lower lip 20–35 mm. long, distally saccate less than half its length, the proximal part abruptly much narrower than the upcurving sac, internally long-pubescent with white hairs at the base; stamens with filaments ca. 1.5–2.5 mm. long, anther cells unequal or very rarely equal, sagittate, the larger of each pair about 3 mm. long and 1.0–1.5 mm. wide, the other cell from subobsolete to about three-fourths as large, often varying from flower to flower on a single plant, when almost lacking reduced to a sterile flap at the apex of the filament, the stamen appearing uniloculate unless magnified (ca. 30 ×); style erect, 2.5–3.0 mm. long, ovary glandular; capsule ovoid, little shorter than the calyx, apically narrowed, style persisting.

Ancash: Tranca, near Chiquian, alt. 3,220 m., *Ferreyra 5691*; Capillapunta, mountain S. of Chiquian, alt. 3,540 m., *Ferreyra 5732*; Mountain E. of Chiquian, alt. 3,500–3,550 m., *Ferreyra 7334*; *7342* (herbaceous); Marcara, Prov. Huaraz, alt. 3,000 m., *Nuñez 3234*; Stream bed, S. of Huaraz, alt. 3,100 m., *Pennell 15263*; Monterrey, 3 km. below Huaraz, alt. 3,000–3,100 m., *Pennell 15309*; Shrub, bushy banks, alt. 3,200–3,500 m., N. of Chancos, *Pennell 15320*;

Bushy, rocky slope along stream, S. of Río Santa, alt. 3,100–3,150 m., opposite Huaraz, *Pennell 15328*; Sandy banks, alt. 3,400–3,450 m., Cerro Shaurema, SE. of Huaraz, *Pennell 15352*; Low mountain toward El Huascaron, N. of Yungay, alt. 2,850–2,900 m., *Pennell 15422* (anther cells equal); Summit of Cerro Shaurema, SE. of Huaraz, alt. ca. 3,500 m., *Pennell 15428*; Bed of Québrada de Huaqui, alt. 3,000–3,050 m., N. of Huaraz, *Pennell 15436*; Hills N. of Huaraz, alt. 3,100–3,150 m., *Pennell 15438*; Jalca, E. of slope of Cordillera Negra, opposite Huaraz, alt. 3,600 m., *Pennell 15464*.—Lima: Chicla between San Mateo and Casapalca, alt. 3,700 m., *Ferreyra 6515*; Rimac Valley, alt. 4,000 m., *Rauh-Hirsch P1794*.

This species is easily separated from the other members of the genus by the combination of very unequal anther cells, deeply lobed leaves, long petioles, and the irregularly varying inflorescence.

Calceolaria pinnata L., Mant. II. 171. 1771. *C. pulchella* Salisb., Prodr. 89. 1796. *C. bipinnatifida* Phil., Fl. Atac. 36. 1860.

Annual, branching herb, sparsely to densely puberulent to occasionally almost glabrous, stems sometimes repent. Leaves petiolate, blades up to 7–10 cm. long, all pinnate, with 4–5 pairs of subopposite pinnae, sometimes bipinnate or pinnae pinnatifid and often variable in outline, usually irregularly coarsely dentate, uppermost pinnae frequently alternate; petioles up to about 3 cm. long, mostly a little shorter; inflorescences usually 3-flowered, terminal dichasia, rarely in branched dichasia; pedicels 6–12 mm. long, glandular-pubescent; calyx lobes ovate to broadly ovate, 4.5–7.0 mm. long and up to 5 mm. wide, sparsely, minutely, gland-tipped puberulent, venation parallel, conspicuous; corolla yellow, variable in size, 8–20 mm. long or even longer, externally glabrous, upper lip shorter than the calyx, hooded, 3–6 mm. long; lower lip saccate two-thirds to three-fourths of its length, sac expanded, little longer than wide; both cells of each anther fertile, the upper larger, all cells exceeding the connective arm in length; style ca. 1.5 mm. long, persisting on the capsule; ovary sparsely glandular-puberulent; capsule broadly ovoid, pubescent as the ovary, apically narrowed, little longer than the calyx and about as long as wide.

Libertad: Prov. Trujillo, Cerro Campana—"Farolillo," alt. 420 m., *Angulo 0699*.—Lima: Amancaes, vicinity of Lima, loma vegetation, *Asplund 13724* and alt. 380–420 m., *Ferreyra 3969*; Valley of Amancaes, alt. 245–275 m., *Mexia 4018*; Cerro de Amancaes, alt. 200–600 m., *Pennell 15925*; Rock ledges on hills S. of Atocongo, alt.

200–600 m., *Pennell & Anderson 15942*; Chancai, Lomas de "Lachai," among rocks, alt. 500 m., *Vargas 4688*.

This is one of the very few wholly low elevation species of *Calceolaria* in Peru.

Calceolaria pisacomensis Meyen, Reise 1: 469. 1830.

Herb or subshrub up to 50 cm. tall or even taller, newer branches, foliage, flower stalks, calyx margins externally and calyx tissue internally more or less densely, glandular-puberulent. Leaves ovate or deltoid, 1–5 cm. long and 0.6–4.0 cm. wide, uppermost perfoliate-amplexicaul, middle sessile, lower short-petiolate, acute or upper acuminate at apex, broadly obtuse, subtruncate or subcordate at base, grossly and irregularly dentate-serrate; inflorescences subumbellate-corymbose, often many-flowered but varying to few-flowered; basal peduncle 2–3 times longer than intermediate peduncles, these latter branching into pedicels only little shorter; interfloral leaves apparently lacking; calyx lobes ovate, acute, 4–6 mm. long and 3–4 mm. wide; corolla essentially glabrous within and without, upper lip and the lower distally red or red-brown, proximally yellow, upper lip 2–3 mm. long, lower 20–28 (–30) mm. long, saccate less than half its length; stamens longer than the upper lip, anther cells equal, divaricate, each pair of cells 3.0–3.5 mm. long, each cell at least 2–3 times longer than wide; style ca. 2 mm. long, curved at apex, ovary glandular; capsule ovoid, glandular, little shorter than the calyx, the abrupt narrowing to a neck absent, the short style persisting.

Arequipa: Plateau between Arequipa and Puno, near Arequipa, alt. 2,600–4,000 m., *Ferreyra 2598*; Pichu-pichu, among rocks, in dry steam bed and rocky slopes, alt. 10,000–12,000 ft., *Stafford 668*; Jésus–Chiquata, alt. 3,100 m., *Vargas 8091*.

This endemic is unusual in having essentially red flowers.

Calceolaria plectranthifolia Walp., Nova Acta Acad. Nat. Cur. 19 (Suppl. 1): 395. 1843.

Small, much-branched, caespitose or subcaespitose shrublet, with the leaves densely congested. Leaf-blades on basally expanded, ochraceous petioles up to 5 mm. long, oblong or obovate, ca. 2 cm. long and 1 cm. wide, margin doubly dentate, rugose above, reticulate venose and brown-puberulent beneath; floral leaves usually entire; inflorescences dichotomously branching, many-flowered; pedicels and

calyx lobes very sparsely pilose or glabrous; base of the calyx densely pilose, lobes oblong, obtuse, the posterior larger than the others; corolla yellow, 8–10 mm. in diameter, upper lip minute, lower lip globose, inflated; filaments much longer than the equal-celled anthers.

Description from Kränzlin and type photograph. Originally collected by Meyen in Arequipa.

Calceolaria procera Pennell, Proc. Acad. Nat. Sci. Phila. 97: 154. 1945.

Tall shrub, at least the lower nodes longer than the sessile or very short-petiolate leaves, young growth puberulent, becoming glabrate with age. Leaf blades widely linear or oblinear, mostly 3–7 cm. long and 3–8 mm. wide, subacute to rounded at apex, attenuate at base, sparsely denticulate to entire, slightly revolute, dark green and glabrous above, paler and puberulent beneath; petioles when present 1 cm. long, narrowly connate across the nodes; inflorescences paired cymes from upper leaf-axils; bracts lanceolate, bractlets shorter, a little wider, bracts, bractlets and calyx yellow (at least in life); pedicels and peduncles glabrous, peduncles ca. 3 cm. long about equaling the combined length of the secondary peduncles and pedicels, all flower stalks more or less puberulent; sepals ovate, apex rounded, ca. 10 mm. long, pubescent on both surfaces; corolla darker yellow than bracts and calyx, minutely puberulent proximally, upper lip ca. 2–3 mm. long, lower lip 10–20 mm. long (mostly 16–20 mm.), saccate less than half its length, non-saccate part internally puberulent and also hirsute at the orifice with much longer hairs; anthers 5 mm. long, cells divergent (sagittately so) or divaricate, unequal, at least two times longer than wide; style ca. 3 mm. long, thickened on lower half and also pubescent, apically curved, ovary pubescent; capsule little shorter than the calyx, ca. 8 mm. long, globose-ovoid, eglandular, pubescent.

Cuzco: Prov. Urubamba, Lucumayo Valley, alt. 1,800–3,600 m., *Cook & Gilbert 1315*; Prov. Calca, below Lares, *Weberbauer 7891*.

This endemic in the two provinces of Dept. Cuzco is unusual in having yellow floral leaves.

Calceolaria pseudoscabra Edwin, Phytologia 19: 392. 1970.

Coarse perennial herb, erect, branched, foliage, stems and branches drying brown, stems and branches glandular-puberulent. Leaves mixed glandular and eglandular-puberulent, sessile or less often short-petiolate, ovate to broadly elliptically ovate, mostly 2.0–3.5

cm. long and 1.0–2.1 mm. wide, margins revolute, crenate, narrowed to an obtuse apex, base broadly obtuse, tissue scabrous, costa elevated and prominent beneath; young inflorescences arising in pairs from the upper leaf-axils, cymose, few-flowered; peduncles glandular-pubescent, 2–5 times longer than the pedicels; bracts and bracteoles reduced floral leaves, bracts occasionally with a pair of lobes near the base; calyx lobes mixed glandular- and eglandular-pubescent on both surfaces, elliptic-ovate, long-acute, 4–5 mm. long and ca. 3.5 mm. wide; corolla yellow, upper lip glabrous, 1–2 mm. long; lower lip externally short-glandular-puberulent, saccate over most of its length, 13–15 mm. long and about 5 mm. wide, a tuft of white hairs present at base within; stamens short, anthers large for the small corolla, anther cells divaricate, unequal, usually at least twice as long as wide, the larger 1.8–2.0 mm. long, the smaller 1.2–1.5 mm.; style ca. 1.5 mm. long, thickened, ovary glandular; capsule unknown.

Cajamarca: Wet place, alt. 2,700–2,900 m., mountain E. of Celendin, *Pennell 15213* (PH).

Closest to *Calceolaria scabra* and *C. variefolia*, differing from the former in being a much coarser plant with larger leaves and from the latter in having the internodes much shorter as well as in growth form, an herb as opposed to a shrub.

Calceolaria pulverulenta R. & P., Fl. Peruv. 1: 19. 1798.

Shrub, erect or scandent, stems and branches white-tomentose. Leaves canescent above and more densely beneath, ovate or elliptical, up to 5 cm. long and 2.3 mm. wide, crenulate or crenate, subacute to acute apically, broadly acute to subobtuse basally, short-petiolate or sessile; inflorescences paniculate, sometimes reaching 20 cm. long, most often shorter, ultimate inflorescence branches corymbose or dichasiate; calyx lobes externally canescent, internally with a distinct row of hairs along the margins, ovate, 5–7 mm. long, acute; upper lip of the yellow corolla, about twice as long as the calyx, lower lip 1.0–1.2 cm. long and ca. 1.5 cm. wide, saccate about half its length; filaments short, anther cells equal, drying black or dark brown.

No specimens seen. Reported from northern and north-central Peru and also from Ecuador. *Killip & Smith 24377* from Junin, alt. 2,700–3,200 ft., may possibly pertain here.

Calceolaria pumila Edwin, Phytologia 19: 393. 1970.

Tiny unbranched herb up to 6 cm. tall, the simple stem densely glandular-pubescent, bearing 1–3 pairs of oblong or ovate leaves.

Leaf blades sessile, entire, up to 1.2 cm. long and 0.8 cm. wide, usually reaching 0.9 cm. by 0.7 cm., puberulent-pubescent on both surfaces; flowers solitary, pedicellate, terminal or in the upper leaf-axils, tiny, up to 7 mm. long and 2 mm. wide, yellow; pedicels short, up to 7–8 mm. long, glandular-pubescent; calyx lobes elliptical, acute, 3.0–3.5 mm. long and 1.5–2.2 mm. wide, externally glandular-pubescent; upper lip of the glabrous corolla ca. 2 mm. long, lower lip 5 mm. long, sac laterally placed the length of the lip but only about 0.5 mm. thick medianly from the distal end; stamens very small, filaments thickened, less than 1.0 mm. long, anther cells equal, drying white to light yellow, each anther ca. 1.0–1.2 mm. long, each cell a little longer than wide, divaricate; style thickened, ca. 1.0 mm. long, ovary sparsely glandular-puberulent; capsule elliptical, sparsely glandular-puberulent, 6.0–6.5 mm. long and 2.0–2.5 mm. wide, much exceeding the calyx.

This taxon has the smallest flowers of any in Peru.

Known only from the type specimen.

Cajamarca: Rocky limestone on ridge 11 km. S. of Cajamarca, alt. 2,750–2,850 m., *Pennell & Anderson 15078* (PH).

Since the sheet is not marked, unicate isotypes are probable.

A unique taxon in the genus, at least in Peru. No close relative is known at this time.

Calceolaria ramosissima Kränzl. in Fedde, Rep. Sp. Nov. 1: 107. 1905; non 1913.

Vining shrub, newer wood pubescent, older ultimately glabrous, much branched, branches ascending, drying brown to dark purple-brown. Leaves ovate, opposite or ternate, little longer than wide to almost twice as long as wide, 0.8–3.0 cm. long and 0.5–1.5(–2.0) cm. wide, pubescent on both surfaces, serrate, occasionally serrate-dentate, apically narrowed, basally obtuse to very broadly obtuse; inflorescences terminal and in the axils of the upper leaves, dichasiate, few to several-flowered; flower stalks pubescent, up to about 1 cm. long; calyx lobes dimorphic, ovate, usually obtuse and venose, 2.5–3.5 mm. long and 2.0–2.5 mm. wide, or lanceolate, usually acute and veins obscure, 2.5–3.5 mm. long and 1.5–2.0 mm. wide, mostly pubescent on both surfaces, especially at the margins; corolla yellow, minutely and densely pilose, 10–15 mm. long, upper lip much shorter than the calyx lobes, lower lip saccate a little less than half way, nectary on the upper margin of the sac, thickened and very narrow, lip usually less than half as wide as long, even distally; anther cells

reniform, approaching twice as long as wide, each pair less than 3 mm. long on thickened, short filaments; style 1–2 mm. long, ovary mostly few-glandular, glands sessile, golden resinous; capsule ovoid about as long as the calyx, gradually and evenly tapering to the acute apex, vesture as the ovary.

Ancash: Chiquian, Prov. Bolognesi, alt. 3,220 m., *Ferreyra 5698*, Stony puna, S. slope of Paso de la Fortaléza, alt. 3,550–3,600 m.; *Pennell 15395*; Thickety bank below Chiquian, alt. 3,200–3,300 m., *Pennell 15404*.—Cajamarca: Sandy soil on cumbra above Cajamarca, alt. 3,500 m., *Olsson 2a*; 6 miles N. of Cajamarca, on road to Chota, sandy soil, alt. 2,800 m., *Olsson 4a*; Road from Cajamarca to Celendin, alt. 2,750–4,000 m., *Scolnik 1314*.—Lima: between Matucana and Surco, Prov. Huarochiri, alt. 2,100–2,200 m., *Ferreyra 7599*.

The southernmost collections (Ancash and Lima) possess the lanceolate sepals.

Calceolaria ranunculoides Kränzl. in Fedde, Rep. Sp. Nov. 1: 97. 1905.

Annual herb in wet to dry places, stems rooting freely, prostrate or ascending, plant frequently glandular-pubescent, glands often black. Leaves variably petiolate; petioles descrete; blades long-petiolate below and petioles decreasing in length to the apex, or sometimes blades all sessile or subsessile, variable in shape and size, mostly ovate and dentate or lobed up to the middle, ovate and doubly dentate to entire above the middle, all blades occasionally varying to deeply lobate or subpinnatifid, from 1 to 6 cm. long or even longer (petiole included); flowers most often borne singly on the ends of short branches, occasionally in few-flowered dichasia; pedicels up to 5 cm. long, glandular-pubescent; calyx lobes ovate, 6.5–8.5 mm. long, acute, glandular-pubescent; corolla yellow often glandular-pubescent on both surfaces, sometimes only externally, upper lip 5–7 mm. long, lower up to 3.0 cm. long, usually 2.0–2.5 cm. long, saccate about two-thirds its length, sac large, much inflated; filaments short, anther cells very unequal, upper fertile cell much larger than the lower cell which is sometimes sterile, connective longer than the cells; style ca. 1.5–2.0 mm. long; capsules ovoid, acute, from as long as to 1½ times longer than the calyx, glandular-pubescent.

Amazonas: Colcamar, valley below jalca, alt. 3,300 m., *Pennell 15640*; Puente de Pipos, on Río Sonche, opposite Daguas, E. of Chachapoyas, alt. 2,000–2,100 m., *Pennell 15755*; "Hidalgo," below

Chachapoyas, alt. 1,800 m., Tarnawiecki for *Pennell 15912*.—Ancash: Consuzo, Prov. Pallasca, alt. 3,700 m., *Lopez 2384*; Above Racrachaca, Prov. Bolognesi, alt. 3,300–3,400 m., *Ferreyra 7511*; Usger, below Chiquian, alt. 3,250–3,300 m., *Ferreyra 7560*; Huaraz, alt. 3,000 m., *Pennell 15301*; Chancos, alt. 3,000–3,200 m., *Pennell 15311*; *15317*; Copa grande, N. of Chancos, alt. 3,250 m., *Pennell 15361*; in stream and bog, Colcas, alt. 2,500–2,600 m., *Pennell 15385*; Paso de la Fortaléza, alt. 3,550 m., *Pennell 15396*.—Cajamarca, Hacienda Limon, *Carricker s.n.*; NE. of Cajamarca, alt. 3,650 m., *Pennell 15143*; Along streams on jalca, Cordillera de Cumulloa, to Celendin, alt. 3,400–3,500 m., *Pennell 15168*; Mountain E. of Celendin, alt. 2,600–2,700 m., *Pennell 15199*; Llacanora, alt. 2,550–2,600 m., *Pennell 15490*; 15–20 km. above Cajabamba, alt. 2,900 m., *Pennell & Ferreyra 14582*; 10 km. above Cajabamba, 2,900 m., *Pennell & Ferreyra 14662*; SW. of Cajamarca, alt. 2,800 m., *Pennell & Reichlin 15022*.—Cuzco: Macchu-picchu, Valley of Río Urubamba, ruins, *Ugent & Ugent 5340*.—Huanuco: Dist. Churubamba, trail Puente Durand to Exito, Québrada de Gaza, alt. 1,450 m., *Mexia 8244*.—Junin: Huacapistana, alt. 1,800–2,400 m., *Killip & Smith 24095*; Pichis Trail, Eneñas, alt. 1,600–1,900 m., *Killip & Smith 25768*; Huancayo, alt. 3,317 m., *Soukup 3001*.—La Libertad: Above Motil, dry open jalca, alt. 3,200 m., *Pennell & Ferreyra 14847*; Wet cliff, 3–4 km. above Huamachuco, alt. 3,250 m., *Pennell & Ferreyra 14871*; W. edge of Huamachuco, alt. 3,050 m., *Straw 2527*.—Lima: Chosica, alt. 800 m., *Soukup 2051*.—Sin. Dept.: Chasqui, *Macbride 3294*.

The description here is much broader than that of Kränzlin who saw far less material. The texture as well as the size, shape, and margins of the leaves is quite variable. The blades are thinly chartaceous to very firm or almost subcoriaceous. The thin leaves are most frequently the larger.

This taxon may be conspecific with *Calceolaria aquatica* Brown and Bouché of Bolivia but is provisionally held distinct on the bases of vesture and venation differences.

Calceolaria reichlinii Edwin, Phytologia 19: 394. 1970.

Shrub erect and branched, wood, leaves, flower stalks, and calyces more or less densely beset with long, silvery, soft hairs (lanate), the leaves beneath and calyx lobes most densely so, the vesture sometimes fugitive with age, usually eglandular except occasionally for the corolla and frequently the ovary. Leaves most often linear or

aciculiform, occasionally broadening to lance-ovate, sessile or almost so, the vesture frequently completely obscuring the tissue beneath, margins mostly entire, revolute, obtuse apically, blades sessile; inflorescences 1- to few-flowered; flower stalks up to 2 cm. long, usually less; calyx-lobes elliptical or elliptically ovate, rarely ovate, 5–8 mm. long, and up to 4 mm. wide, acute, the tissue frequently completely obscured by the vesture externally, glabrous or sometimes with a few hairs paralleling the margins or very rarely a few glands present internally; corolla yellow, variable in size, 12–25(–28) mm. long, externally glabrous or few-glandular, rarely papillose, saccate more than half its length, internally glabrous; anther cells unequal, 2 or more times longer than wide, completely divaricate, each pair of cells up to 4 mm. long, septum thickened; style 2–4 mm. long, glandular at base; ovary glandular-pubescent or long-pubescent, rarely merely few-glandular; capsule narrowly conic-ovoid, about as long as the calyx, vesture as the ovary, blunt at the apex, attenuate, style persisting.

Common in Dept. Cajamarca, in the Andes of northern Peru and three collections also seen just to the south in Dept. Libertad.

Cajamarca: Dry banks (volcanic soil), 15–20 km. above Cajabamba, alt. 2,900 m., *Pennell & Ferreyra 14853*; Prov. Cajabamba, km. 38, N. of Huanachuco, near Cajabamba, alt. 2,900–3,000 m., *Ferreyra 3044*; On cumbre above Cajamarca, alt. 3,500 m., *Olsson 2*; 6 miles N. of Cajamarca on road to Chota, sandy soil, alt. 2,800 m., *Olsson 4*, pro. parte; Celendin-Balsas road-km. 124, *Olsson 4a;* Mountain E. of Celendin, alt. 2,700–3,000 m., *Pennell 15173*; Alt. 2,400–2,800 m., *Pennell 15177*; Rocky calcareous hillside, NE. of Cajamarca, alt. 2,600–2,700 m., *Pennell 15230*; Rocky limestone ridge, 11 km. S. of Cajamarca, alt. 2,750–2,850 m., *Pennell & Anderson 15082*; Cliff about 10 km. above Cajamarca, alt. 3,200 m., *Pennell & Ferreyra 14865*; Open jalca, Paso de Gavilán, S. of Cajamarca, alt. 3,000–3,300 m., *Pennell & Ferreyra 14959*; Jalca SW. of Cajamarca, alt. 2,700 m., *Pennell & Reichlin 14981;* Stony limestone, Michiquillo, alt. 3,100 m., *Pennell & Reichlin 15034;* Alt. 2,750–4,000 m., on the Cajamarca–Celendin road, *Scolnik 1308*.—Libertad: 2–3 km. above Otuzco, Trujillo–Otuzco road, alt. 2,500 m., *Ferreyra 2977;* Sandy area, S. of Otuzco, alt. 2,500 m., *Pennell & Ferreyra 14820;* km. 82 W. and below Agallpampa, alt. 2,900 m., *Pennell & Ferreyra 14832*.

This species is close to *C. linearis* R. & P. The latter differs in having much shorter and sparser indument, apically acute leaves,

usually dichasiate inflorescences, shorter calyx segments that are internally pilose, minute upper lip of the corolla, and much shorter style.

Calceolaria revoluta Penn., Proc. Acad. Nat. Sci. Phila. 97: 165, *Pl. 13A*. 1945.

Glandless, erect or ascending, branched shrub, ascending-pubescent or puberulent on the wood and in the inflorescence. Leaves linear or linear-oblanceolate, 2.0–2.5(–3.0) cm. long and 2–3(–5) mm. wide, margin entire, revolute, blade minutely appressed-pilose above, paler and minutely tomentose beneath; petiole ca. 1 mm. long, white-villose, basally indurate and narrowly connate; inflorescences terminal, clustered, usually 1-compound cymes; peduncles up to 2–3 cm. long below, appressed-pubescent as the 7–15 mm. long pedicels; bracts lanceolate, smaller than the leaves, bractlets minute or wanting; sepals yellow in life, yellow-green when dry, ovate, 4–5 mm. long, entire, acute to subobtuse, finely appressed-puberulent; corolla yellow, externally finely puberulent, upper lip ca. 3–4 mm. long, hooded, lower lip to 19(–22) mm. long, saccate less than half its length, internally on the lower surface a tuft of hair at the orifice, crossed with red, dot-like marking above the tuft and then distally minutely puberulent; anther cells subparallel to little diverging (1.5)2.0–3.0 mm. long, usually equal, occasionally a little unequal, acute above the septum which parts at dehiscence; style 4–5 mm. long, basally pubescent, apically curved, ovary densely pubescent; capsule ovoid-subconic, 4–5 mm. long, ca. equaling the calyx, densely pubescent with upcurving indument.

Cuzco: Valley of Paucartambo, alt. 3,400 m., *Herrera 2991*; Paucartambo to Trés Cruces, Cerro de Cusilluyoc, alt. 3,300–3,500 m., *Pennell 13802* (Isotypes F; PH; US); Paso de Trés Cruces, Cerro de Cusilluyoc, paramo, alt. 3,800–3,900 m., *Pennell 13885*; Pampa Corral (Lares), Prov. Calca, alt. 3,400 m., *Vargas 3208*; Québrada de Llulluchayocc, Prov. Paucartambo, river bank, alt. 3,650 m., *Vargas 4282*; Below Lares, alt. 3,100–3,200 m., *Weberbauer 7891*.— Sin. Loc.: *Diehl 2533*.

Calceolaria rhacodes Kränzl. in Engler, Bot. Jahrb. 50: Beibl. 111, 71. 1913.

Shrub to occasionally herbaceous, most often erect, older stems and branches glabrate, younger usually pilose, drying violet, usually well-branched, internodes increasing in length toward the base.

Leaves broadly ovate in outline, occasionally oblong-ovate, up to 6 cm. long and about 4 cm. wide, vesture variable, from sparsely puberulent on both surfaces to densely lanose beneath, upper surface usually sparsely pubescent, 5–7-lobed, the lobes frequently dentate, blades broadly acute at apex, truncate to shallowly cordate basally, occasionally broadly obtuse, lowermost subsessile, upper and median on petioles up to 2 cm. long; inflorescences variable, irregularly corymbose or dichasiate, or simply cymose or flowers merely singly paired; bracts of the basal branches of the inflorescences foliose; pedicels and peduncles thin, densely glandular-pilose, peduncles up to about 2 cm. long, rarely longer; calyx externally glandular-pilose or pilose, with 2–3-celled hairs, lobes ovate, narrowly obtuse, 5.0–6.5 mm. long; corolla yellow, 16–30 (–35) mm. long, varying in length from plant to plant but closely fixed on a single plant, minutely glandular-pilose, upper lip shorter than the calyx, lower saccate more than half way, distally almost as wide as long; anther cells two or more times longer than wide, wholly divaricate, usually large for the corolla, each pair up to 5–6 mm. long, cells of a pair equal or unequal; style ca. 3.0–3.5 mm. long, glabrous, apically curved, ovary glandular, shorter than the style; capsule oblong-ovoid, shorter than the calyx, apically rounded or obtuse, neck lacking, style persisting.

Ancash: Cerro S. of Chiquian, Capillapunta, alt. 3,540 m., *Ferreyra 5725*; Cerro E. of Chiquian, alt. 3,400–3,500 m., *Ferreyra 7338*. —Ayacucho: Above Puquio, Prov. Lucanas, alt. 3,400–3,500 m., *Ferreyra 5508*; Marcahuasi, above Puquio, alt. 3,400–3,450 m., *Ferreyra 7212*; Coracora, alt. 3,200 m., *Weberbauer 5809* (Isotypes PH; US); *6038*; *6040*; *6400*.—Libertad: Usquil, Prov. Otuzco, alt. 3,000–3,100 m., *Ferreyra 7641*; *7649*; Agallpampa, alt. 3,200 m., *Lopez 0337*. —Lima: Prov. Huarochiri, above Surco, alt. 2,800–3,000 m., *Ferreyra 699*; *3446*; Alt. 3,200–3,300 m., *6094*; Alt. 3,000 m., *Hrdlicka s.n.*; Matucana, alt. ca. 9,000 ft., *Macbride & Featherstone 468*; S. of Surco, alt. 2,700–3,000 m., *Pennell & Ferreyra 15257*.—Piura: Palambla, alt. 3,500 m., *Carricker s.n.*; Above Canchaqui, alt. 1,700–1,900 m., *Pennell & Ferreyra 14911*.—Sin. Dept.: Al Paso del Indio, alt. 3,000 m., *Ochoa 1625*.

Calceolaria rhizomatosa Kränzl. in Engler, Bot. Jahrb. 50: Beibl. 111, 70. 1913.

Repent, twining or erect shrub with a woody rhizome, usually with more branches above than below, sometimes (ex desc.) sub-

caespitose, wood strigulose and puberulent. Leaves sessile or short-petiolate, oblong or lance-ovate, mostly 2–3 cm. long and up to 1 cm. wide, occasionally lower leaves on the stem reaching 5 cm. long and almost 2 cm. wide, entire to distantly, minutely dentate, narrowed to base and apex, short-pilose above, punctate and glabrous beneath, except on the veins; inflorescences branched, arising from the axils of the upper leaves; peduncles up to 4 cm. long; pedicels 1.5 cm. long, both stalks puberulent; bracts lanceolate, conspicuous; flowers yellow, ca. 18–20 mm. long; calyx lobes broadly ovate, acute, ca. 5–6 mm. long, puberulent on both surfaces; upper lip of the corolla ca. 1.3–2.5 mm. long, lower lip ca. 16 mm. long, saccate less than half its length, proximally white-puberulent externally beneath, sparsely long-pubescent proximally within and with a tuft of hair at the long orifice; anther cells equal, ca. 3 times longer than wide, plane or downturned distally, divaricate or divergent; style ca. 2 mm. long; semimature ovary ovate. (Ex. desc.)

Ayacucho: Near Coracora, Prov. Parinacochas, alt. 3,200 m., *Weberbauer 5803*, Isotype; Below Totorabamba, Prov. Huamanga, alt. 3,300–3,400 m., *Weberbauer 5478*.

Calceolaria rhododendroides Kränzl. Pflanzenr. 4(257c): 88, *fig. 17, a–b.* 1907.

Small, erect, branched shrublet to 50 cm. tall, older wood sparsely pilose, younger wood densely lanate. Leaves short-petiolate, subdense, younger blades, densely lanate above and beneath, older becoming glabrous except for the revolute margins and midvein, ovate, 1.2–1.8 cm. long and 4–6 mm. wide, acute at apex, little dimidiate at base, rigid, midvein beneath wide and prominent, older leaves ferrugineous below with bright, green venation; inflorescences in uppermost leaf-axils of the branches, few-flowered cymes; flower stalks densely lanate; calyx segments lanate externally at least on lower half, glandular internally, elliptic, obtuse, ca. 4 mm. long and 2 mm. wide; corolla yellow, densely pilose, 13–17 mm. long, upper lip hooded, 2–3 mm. long, lower lip obovate, dilated, sac shorter than the open part; filaments short, anther locules equal, only little longer than wide, large, walls and septa thickened; style 5–7 mm. long, ovary densely beset with long, gland-tipped, golden-brown hair. Only fragments of the type seen, description largely after Kränzlin (1907).

Cajamarca: Between Cajamarca and Celendin, alt. 3,700–3,800 m., *Weberbauer 4242*.

Calceolaria rosmariniifolia Lam., Encycl. 1: 556. 1783. *C. ferruginea* Cav., Icon. 5: 27, *t. 445, fig. 1.* 1799. *C. graminifolia* HBK., Nov. Gen. et Sp. 2: 386. 1817. *C. bifida* Willd. ex Link, in Spreng., Bot. Jahrb. 1: 52. 1820. *C. hartwegii* Benth., Pl. Hartweg. 147. 1844.

Erect, sparsely or wholly unbranched subshrub, sometimes herbaceous or vine-like above, wood glabrous below, sparsely to densely pilose or glandular-pilose above. Leaves sessile and often narrowly connate, linear to lance-linear, 5–10 cm. long and 6–10 mm. wide, entire and often revolute, apex acuminate, glabrous, often shining and glutinous above, usually tomentose or pilose beneath; inflorescences in upper leaf-axils, paniculate, the basal stalks repeatedly branching; peduncles and pedicels glandular-pilose and often also glutinous; calyces broadly ovate to triangular-ovate, glandular-pilose or occasionally merely glutinous-puberulent, 3.5–4.0 mm. long and 3.0–3.5 mm. wide, sometimes as long as wide; corolla yellow, glandular-pilose externally, sparsely so internally or varying to wholly glabrous, 13–15 mm. long, upper lip little shorter to little longer than the calyx, lower lip 2–3 times longer than the upper; filaments short, anther cells equal, almost as wide as long to 1.5 times longer than wide; style 2–3 mm. long, ovary glutinous, papillose to puberulent. Only fragments seen, description after Kränzlin.

Sin. Dept.: At the foot of Chimborazo, alt. 3,600 m., *Bonpland 3145*; near Tarca, alt. 2,800 m., *Bonpland 3204*. This species is also known from Ecuador.

Calceolaria rugulosa Edwin, Phytologia 19: 395. 1970.

Erect, branched, pilose-tomentose shrub, stems appressed-pilose below, tomentose above, and with the leaves drying light brown, the leaves also sometimes drying brown-green, tomentum densest on young growth. Leaves opposite or ternate, ovate or elliptic-ovate, occasionally elliptical (1.5–)3.0–5.0 cm. long and (1.0)2.0–3.5 cm. wide, margins plane, serrate to doubly serrate, sometimes grossly so, narrowed to an acute apex, obtuse to broadly obtuse at base, rugose or rugulose, pilose above, tomentose beneath, sometimes, especially when young, the vesture obscuring the leaf tissue, often with golden-yellow glands intermixed beneath; petioles 1–4(–6) mm. long, thickened, woody, densely tomentose, usually narrowly connate; inflorescences in upper leaf-axils and also terminal, many-flowered, compound dichasia or corymbose; flower stalks densely long-soft-pubescent; bracts merely reduced leaves; calyx tube and lobes densely pilose externally, glabrous internally, lobes ovate or broadly ovate,

acute, 6–8 mm. long; corolla yellow, up to 1 cm. long, externally very short-puberulent, internally glabrous; upper lip 1–2 mm. long; lower lip ca. 6–8 mm. long, saccate only 1–2 mm.; anther cells equal, each pair ca. 2.0–2.2 mm. long, almost twice as long as wide; style thin, glabrous, 1.0–1.5 mm. long, ovary glandular; capsule ovoid-conic, a little shorter and loosely invested by the calyx, apically long-acute, sparsely golden glandular.

Cajamarca: Rock cliff below Llama, alt. 1,800–1,850 m., *Pennell 15917,* (US); Earth bank, Llama, alt. 1,850 m., *Pennell 15916.*

This taxon is related to *C. aperta* Edwin, but it is morphologically quite distinct.

Calceolaria salicifolia R. & P., Fl. Peruv. 1: 18, *t. 19, fig. b.* 1798, non Morris, nec Griseb.

Erect shrub, or occasionally woody vine, essentially glabrous, often up to 2 m. tall, glutinous and shining. Leaves petiolate, often coriaceous, lanceolate, lance-elliptic or lance-ovate, very rarely a few leaves ovate, often longer than 8 cm., occasionally not exceeding 3–4 cm. long and usually not more than 2 cm. wide, rarely reaching 4 cm., margins closely and sharply serrate or doubly serrate, rarely subentire, apex acute or long-acute, base subobtuse, sometimes dimidiate, much darker above than beneath, often drying brown, veins mostly apparent beneath, costa usually elevated; inflorescences corymbs, dichasiate or dichasia, with two reduced leaf-like bracts at the base and 2–3 bracteoles at the forking or branching of the peduncles; both pedicels and peduncles elongate; flowers large for the genus, up to 5 cm. long and 2.5 cm. wide; calyx lobes most often lance-elliptic and abruptly acuminate, varying to lance-ovate, the anterior narrower than the others, 10–15 mm. long and 5–8 mm. wide; upper lip of the yellow corolla 7–10 mm. long, hooded, margin irregularly cut with rounded teeth; lower lip up to 3.7 cm. long and 2.5 cm. wide, saccate over most of its length, a tuft of white hairs present internally at the base, the lower surface microscopically glandular; filaments 3.5–4.5 mm. long, thickened, anther cells unequal, most often two or more times longer than wide, each pair 7–9 (–10) mm. long; style thickened, uncurved apically, 6–8 mm. long, ovary glutinous; capsule only little more than half as long as the calyx, glabrous, very broadly urceolate but the neck little constricted, median locular suture present as a sulcation.

Amazonas: Cerro Tinaja, alt. 3,200 m., *Ochoa 1684*; *1687*; Mountains E. of Balsas, alt. 10,000 ft., *Osgood & Anderson 75*; Cold moun-

tain forest above Colcamar, alt. 3,200–3,300 m., *Pennell 15623*; Bushy paramillo, Cerro Puma-urco SE. of Chachapoyas, alt. 3,000–3,500 m., *Pennell 15673*; Open cold swamp on summit of Cerros de Calla-Calla, alt. 3,500–3,750 m., *Wurdack 1193*; Summit and uppermost slopes of Cerros de Calla-Calla, near Kms. 403–407 Balsas–Leimebamba road, alt. 3,400–3,550 m., *Wurdack 1710*.—Huanuco: 15 m. SE. of Huanuco, 10,500 ft., *Macbride & Featherstone 2110*; *2122*; Between Kms. 46–48 Huanuco–Panao, alt. 3,000 m., *Ochoa 1105*; Alt. 2,750 m., *Skolnik 1062*; Pillao, alt. 2,700 m., *Woytkowski 47*.—Junin: Sunny grass-shrub slope, alt. ca. 9,000 ft., *Macbride & Featherstone 1604*.—Libertad: In open pasture above (NE) Cachicadon, Prov. Santiago de Chuco, alt. 2,700 m., *Stork & Horton 9987*.—Sin. Loc.: *Dombey 308*; *Ruiz & Pavon s.n.* (two collections).

Calceolaria santalinoides Kränzl. in Engler, Bot. Jahrb. 50: Beibl. 111, 73. 1914.

Differs from *C. incarum* Kränzl. as in the key and also in having smaller leaf blades and less densely glandular and shorter pubescent wood; inflorescences few-flowered and with the ultimate flower stalks (pedicels) among the largest in the genus, the bizarre leaved species excepted.

This taxon is known from collections in Southern Peru in Depts. Ayacucho, Arequipa, and Tacna. It is closely allied to *C. incarum* and the two taxa form a vicarious pair, separated by the middle pass (Morococha–Ticlas) of the Peruvian Andes. The original material was found in Argentina.

Arequipa: Vulcan Chachain, alt. 3,000 m., *Rauh–Hirsch P575*.—Ayacucho: between Nazca and Puquio, near Lucanas, alt. 3,200–3,300 m., *Ferreyra 5474*; Puquio Valley, alt. 3,200 m., *Rauh–Hirsch P419*; S. of Chaviña, alt. 3,200 m., *Weberbauer 5781*; Alto de Tacora, *Isern 2018*.—Tacna: Prov. Tarata, dry granite, rock wall, 8 km. on trail from Candarave to Puno, alt. 3,250 m., *Metcalf 30385*.

Calceolaria sarmentosa Kränzl. in Fedde, Rep. Sp. Nov. 1: 37. 1905.

Usually repent, simple herb, varying to suberect and branched, sometimes dwarfing, ca. 10–15 cm. tall, when erect, stems sparsely pubescent. Leaves short-petiolate, blades ovate or elliptically ovate in outline, only rarely reaching 3 cm. long, usually 0.6–2.5 cm. long, most often deeply 5–7-lobed, lower sometimes 2–3-lobed, upper occasionally almost pluri-pinnate and margins coarsely, irregularly,

doubly dentate, sparsely pubescent above, paler and little or not at all pubescent beneath; petioles up to 2 cm. long, most often densely pubescent; plants flowering from upper leaf-axils only or over most of their length, when apically aggregated the inflorescences irregularly branched cymes; calyx lobes ovate or less often lance-ovate, 4–6 mm. long, acute, varying from glabrous to glandular-pubescent on one or both sides, pubescence frequently lost at time of fruiting; corolla yellow, glabrous or occasionally puberulent externally, 18–30 mm. long, upper lip 2–4 mm. long, lower saccate more than half its length; one cell of each anther sterile and often wholly lacking, connective shorter than the fertile cell, thickened; style persisting in fruit, 1.5–2.0 mm. long, dilated at base at least in fruit; capsule occasionally glandular-pubescent or pubescent, most often sparsely puberulent to glabrous, much longer than the calyx, usually abruptly narrowed to a long neck, sometimes only gradually tapering, either ovoid-conic or ovoid-triangular.

Amazonas: Cerro Puma-urcu, SE. of Chachapoyas, alt. 3,400–3,500 m., *Pennell 15716*.—Ancash: Río Santa, opposite Huaraz, along stream, alt. 3,000–3,150 m., *Pennell 15331*; Sin. Data, *Weberbauer 3121* (type photograph), ex Kränzlin, lower part of Hacienda Cajabamba between Samenco and Caraz.—Ayacucho: Pampalca between Huanta and Río Apurimac, alt. ca. 3,200 m., open hillside, *Killip & Smith 12257*.—Cajamarca: SW. of Cajamarca, moist bank, alt. 2,800 m., *Pennell & Reichlin 15022*.—Huanuco: Carpish, Chancai, alt. 2,200 m., *Vargas 5410*.

Since this species is distinguished by a combination of leaf size, flower size, and fruit size in relation to calyx size and, in addition, since the few collections are so widely dispersed and, finally, since this material is from such diverse habitats it seems not unlikely that this taxon may be more apparent than real. However, at this time it is retained because the material cited does not lend itself to placement elsewhere. Further study of the entire subgenus is required.

Calceolaria scabra R. & P., Fl. Peruv. 1: 19, *t. 29a*. 1798. *C. melissifolia* Benth. in DC., Prodr. 10: 214. 1846. *C. glechomifolia* Kränzl. in Engler, Bot. Jahrb. 54: Beibl. 119, 20. 1917.

Variable, erect or ascending shrub, plant with dense vesture to almost glabrous, stems and branches usually pubescent with 2–3-celled, erect hairs, occasionally a few short, gland-tipped hairs intermixed, sometimes wholly glabrous, the wood of the usually copiously branched, densely foliaceous stem drying yellow to dark red. Leaves

mostly ovate to rhomboidal, occasionally obovate, not exceeding 3.5 cm. long, mostly 0.9–2.5 cm. long and from a few millimeters wide to almost as wide as long, mostly pubescent above as the stem and with more gland-tipped hairs intermixed beneath, the vesture sometimes very dense, obscuring the tissue, rarely wholly glabrous, margin plane or revolute, crenate or dentate, sometimes teeth prominent, apex usually acute, base mostly cuneate to obtuse, tissue bullate or plane, usually thickened, rarely chartaceous, sessile or almost so; flower 10–25 mm. long, solitary or in 2–3-flowered inflorescences, very rarely up to 10–12-flowered; peduncles and pedicels up to 3 or more cm. long, usually glandular-pubescent; bracts reduced or wanting; calyx lobes mostly glandular-pubescent on both sides, sometimes only externally, ovate, acute, mostly 6–8 mm. long and 4–5 mm. wide at base; upper corolla lip minute to 3 mm. long, lower yellow, frequently red-marked within, mostly pubescent with soft hairs externally, glabrous internally, saccate more than half its length, about a half to two-thirds as wide as long; filaments short, anthers large for the corolla, divaricate, almost always at least 2 times longer than wide, cells unequal, septum and often the walls thickened, mostly 4–6 mm. long, shorter in the smaller flowers; ovary mostly pubescent or glandular-pubescent; capsule narrowly ovoid, or lance-ovoid, a little shorter to longer than the calyx; vesture as the ovary.

Widely distributed in the Andes from Cajamarca in the north to Arequipa in the south. The taxon has not yet been reported from the southernmost parts of Peru. The citations below are selected from the copious available material.

Amazonas: Prov. Chachapoyas near Ubilón between Chachapoyas and Leimebamba, alt. 1,500–2,000 m., *Ferreyra 7120*; alt. 2,400 m., N. of Chachapoyas, *Pennell 15499*; Cerro Puma-urcu, alt. 2,500–2,600 m., *Pennell 15519*; Bushy slope, Taquia, E. of Chachapoyas, alt. 2,400–2,500 m., *Pennell 15584*; SE. of Colcamar, alt. 2,050 m., *Pennell 15597*; lower slopes of Puma-urcu, above Hda. Sta. Isabel, 1.5–2.0 km. SE. of Chachapoyas, alt. 2,400–2,500 m., *Wurdack 436*.—Ancash: Prov. Bolognesi, Cerro N. of Chiquian, alt. 3,540–3,560 m., *Ferreyra 5608*; above Aquia, alt. 3,250–3,300 m., *Ferreyra 7516*; below Chiquian, alt. 3,200–3,300 m., *Pennell 15490*; toward El Huascaran, N. of Yungay, alt. 2,850–2,900 m., *Pennell 15426*.—Arequipa: Moquegua Prov., Rainy-green formation, alt. 3,200 m., *Weberbauer 7992*.—Ayacucho: Pampalca between Huanta

and Río Apurimac, alt. about 3,200 m., *Killip & Smith 22222*; *23280*. —Cajamarca: Cajabamba, *Carricker s.n.*; Limestone rocks, NE. of Cajamarca, alt. 3,500 m., *Pennell 15139*; Limestone rocks NE. of Cordillera de Cumulloa to Celendin, alt. 3,500–3,600 m., *Pennell 15154*; mountain E. of Celendin, alt. 2,700–3,000 m., *Pennell 15175*; Quinamayo, alt. 3,500–3,600 m., *Pennell & Reichlin 15048*.—Huancavelica: Prov. Huancavelica, 3 km. SE. of Conaica, alt. 3,560–3,590 m., *Tovar 94*; Bunbunya, W. of Conaica, alt. 3,700–3,750 m., *Tovar 319*.—Junin: Near Huancayo, open rocky hillside, alt. 3,300–3,500 m., *Killip & Smith 22133*; Limestone cliff ledges, La Oroya, alt. ca. 12,000 ft., *Macbride & Featherstone 972*; Limestone, Tarma, alt. ca. 13,000 ft., *Macbride & Featherstone 1059*; Mito, alt. ca. 9,000 ft., *Macbride & Featherstone 1472*; Incahuasi, *Soukup 3181*; Mantaro Valley, near Huachiacna, alt. 3,200–3,300 m., *Weberbauer 6552*.—Libertad: Prov. Otusco: Usquil, alt. 3,000–3,100 m., *Ferreyra 7637*. —Sin. Loc.: *Ruiz & Pavon s.n.*

Calceolaria scandens Pennell, Proc. Acad. Nat. Sci. Phila. 97: 164. 1945.

Climbing shrub with elongated, yellowish-brown, glandular-pubescent stems. Leaves petiolate, ovate, 5–6 cm. long and 3–4 cm. wide, acute, dentate, minutely pilose above, puberulent beneath and reticulate-veined, cordate at base; petioles 15–25 mm. long, glandular-pubescent, basally thickened and connate across the nodes; inflorescences of compound cymes; bracts petioled, bractlets smaller, both of these foliose but less cordate than cauline leaves; flower stalks glandular-pubescent; basal peduncles 6–8 cm. long; remaining stalks decreasing in length to the 20–30 mm. pedicels; sepals lanceolate, 8–9 mm. long, acuminate, sparsely ciliolate; corolla yellow, externally glabrous; upper lip ca. 1.5 mm. long, lower lip ca. 16–19 mm. long, saccate less than half its length, few hairs inside near the orifice; anther cells equal, divaricate, each pair ca. 2.5 mm. long, little longer than wide, dehiscing through the septum; style 1.5 mm. long, apically curved.

Cuzco: Ollantaitambo, alt. 3,000 m., *Cook & Gilbert 750* (US).

Calceolaria scapiflora (R. & P.) Benth. in DC., Prodr. 10: 207. 1846. *Jovellana scapiflora* R. & P., Fl. Peruv. 1: 13, *t. 18, f.6*. 1798. *Calceolaria mathewsii* Benth. l.c. 207. *C. scapiflora* subsp. *dentifolia* Pennell, Proc. Acad. Nat. Sci. Phila. 97: 152, *t. 7a*. 1945.

Plants acaulescent, the radical, rosulate leaves ovate, flowers solitary on pedicels mostly 2–10 cm. long. Leaves usually laxly pubescent on one or both surfaces, 1.0–2.5 (–3.5) cm. long, from about half to almost as wide as long, base attenuate, narrowly winging the short petiole, margin subentire to dentate; pedicel glutinous, glandular-pubescent or -puberulent; calyx lobes rarely 5, unequal, the anterior longest and widest, ovate, 5–7 mm. long and 3.5–5.0 mm. wide, externally puberulent, internally glabrous, venose; corolla yellow, red dotted within, 16–28 mm. long, upper lip from little longer to twice as long as the calyx, its short hood about as long as the sac of the lower lip, from a little more than half as long to about as long and wide as the lower lip that is saccate only up to one-eighth its length; filaments ca. 2.5–3.5 mm. long, anther cells equal, parallel, about three-fourths as wide as long; style from about half as long to longer than the filaments, ovary obconic or obovate, wider than long.

Pasco: Uliachin Ridge, vicinity of Cerro de Pasco, alt. 14,800 ft., *Jenks 38*; Cerro de Pasco; alt. 14,000 ft., *Macbride 3062*.—Cuzco: Urcos, alt. 15,000 ft., *Stafford S. 43*; Paruro, alt. 3,700–3,900 m., *Vargas 843* (Isotype *C. scapiflora* subsp. *dentifolia* Pennell); *Vargas 9819*; Banks of the Checca River, Prov. Canas, *Vargas 11009*.—Junin: Between Tarma and Jauja, alt. 4,500 m., *Killip & Smith 21967*; Puna, Mt. La Juntay, near Huancayo, alt. 4,700 m., *Killip & Smith 22100*; Incahuasi, alt. 4,000 m., *Soukup 3178*.—Lima: Near Antaicocha, Cerro Colorado E. of Canta, alt. 3,900–4,100 m., *Pennell 14662*.—Sin. Dept.: Yauli, alt. ca. 13,000 ft., *Macbride & Featherstone 909*.—Sin. Loc.: *Ruiz & Pavon, s.n.*

Calceolaria serrata Lam., Illus 1: 51. 1783, non G. Don 1838.

Close to *C. inflexa* R. & P., differing in the following ways: leaves up to 5 cm. long and 2 cm. wide; calyx lobes obtuse; upper lip of the corolla minute; entire flower only up to 13 mm. long and 8 mm. wide; foliage puberulent above and canescent beneath.

Reported from departments Lima, Cajamarca, and Amazonas, as well as in Bolivia and Ecuador. None seen.

There is general agreement that *C. serrata* and *C. deflexa* are closely allied or possibly conspecific. Their distinct geographic areas indicates that we are dealing with two taxa.

Calceolaria sibthorpioides HBK., Nov. Gen. et Sp. 2: 382. 1817.

Procumbent herb, branches hispid-pilose. Leaves petiolate, broadly ovate to subrotund, up to 1.5 cm. long and up to 1.1 cm. wide, usually a little shorter and narrower, ca. 1.0 cm. long and 6–8 mm. wide, margins crenate, apex acute, base a little cordate, pilose on both surfaces, especially on the venation beneath, lower surface drying very pale, dull green; inflorescences corymbose or dichasiate, terminal few-flowered; flower stalks glandular-pilose; calyx lobes externally densely pilose, broadly ovate, 4–5 mm. long, almost as wide at base, subacute to obtuse, margin ciliate; corolla yellow, sparsely pilose, ca. 14–17 mm. long, sac of lower lip about 8–10 mm. wide and deep, upper lip shorter than the calyx-lobes, lower lip 10–14 mm. long, saccate less than half its length; anthers up to 3 mm. long, cells equal, each cell about 1.8 times longer than wide; style ca. 2 mm. long, ovary longer than the style, beset with short, erect hairs; capsule not known.

Reported from Cajamarca (Hualgayoc) and Junin–Lima area (Palca to Tarma) from 3,600–4,000 m. alt. The only specimen seen (K) bears no data.

Calceolaria simulans Edwin, Phytologia 19: 395. 1970.

Herb, erect to repent, little- to much-branched, usually up to 25 cm. tall, sometimes only about 10 cm., upper parts of the stems and branches more or less densely glandular- and eglandular-pubescent, remaining parts of stems and branches glabrous to sparsely eglandular-pubescent; upper leaves once or twice pinnate, lower very variable, from dentate to lobed; pinna dentate, sparsely mixed pubescent beneath as the upper parts of the stems and branches; petioles 1–4 mm. long, pubescent as the lower surfaces of the pinnae; inflorescences terminal on the branches and stems, simple or once-branched, few-flowered; bracts foliose, reduced; flower stalks up to 2.5 cm. long, usually not exceeding 1.8 cm., vesture as the upper parts of the branches; flowers yellow, small for the genus; calyx lobes a little unequal, broadly ovate, 4–5 mm. long and 3–4 mm. wide, acute, venose on both surfaces, red at base, sparsely glandular-puberulent on the sinuate margins; corolla yellow, dark brown dotted, glabrous, ca. 10–13 mm. long, upper lip 1.5–2.5 mm. long, lower lip 9–11 mm. long, saccate a little more than half its length, proximal, non-saccate part only little narrower than the distal saccate part; stamens contiguous, small, anthers ca. 1.3–1.7 mm. long, little shorter than the filament, cells equal or slightly unequal, divaricate, little longer than wide, blackened basally near the septum; style very

short, up to 1 mm. long, apically curved; capsule sparsely glandular-puberulent, longer than the calyx, lance-ovoid, abruptly narrowed to a long neck.

Distributed sporadically from Ancash to Ayacucho and Ica.

Ancash: Chacchash near Chiquian, 3,220 m. alt., *Ferreyra 5687;* Casca, below Chiquian, Prov. Bolognesi, alt. 3,100–3,200 m., *Ferreyra 7307* (US).—Ayacucho: Pampalca between Huanta and Río Apurimac, alt. 3,200 m., open hillside, *Killip & Smith 22210.*—Ica: Pisco Valley, alt. 2,900 m., *Rauh-Hirsch P390.*—Lima: Río Blanco, wet E. slope, alt. ca. 15,000 ft., *Macbride 3037.*

This species has the foliage of subgenus *Calceolaria* and flowers of subgenus *Cheiloncos.* It is provisionally placed in the latter grouping. In Peru, thus far, this is the only taxon known to bridge the subgenera.

Calceolaria solanifolia Edwin, Phytologia 19: 397. 1970.

Erect, branched, densely tomentose shrub, up to about 2 m. tall. Wood, the oldest excepted, leaves, petioles flower stalks and calyx bases densely beset with short, curled, white to brown, velvety, often matted hair; leaves ovate, sometimes lanate, up to 8 cm. long and 5 cm. wide, rarely entire, mostly subentire to serrate-serrulate, apex acute, base obtuse, dark green above, light yellow-green beneath, veins very apparent to almost concolorous beneath; petioles 1.5–2.5 cm. long, thickened, very densely pubescent; inflorescences a pair of compound, cymose dichasia, in the axils of the uppermost leaves of the stem and branches; basal peduncles up to 8 cm. long, intermediate flower stalks and pedicels abruptly decreasing in length, ultimately less than 1 cm. long; flowers large for the genus; calyx lobes ovate to elliptic, acute, 10–14 mm. long, 3–7(–8) mm. wide at base, yellow or light green in life, glabrous to sparsely pubescent externally, the hair on or near the margins; corolla yellow, frequently minutely papillose, upper lip 4–6 mm. long, lower up to 25 mm. long, frequently 20–22 mm., saccate about half its length, the sac ovoid-oblong, 12–14 mm. wide, inflated in life; anther cells a little unequal in length and very unequal in shape, walls and septa thickened, both cells at least two times longer than wide, each anther 7–8 mm. long, the smaller cell 3.0–3.3 mm. long; style 5.5–6.5 mm. long, apically curved; ovary ovoid, pubescent, a little shorter than the style; capsule pubescent, ovoid or elliptic-ovoid, shorter than the calyx, acute apically.

Amazonas: Prov. Chachapoyas, E. side of Cerro Calla-Calla on lower and middle slopes. Jalca interfingered with loma and montane forest, alt. ca. 2,800–3,200 m., *Edwin 3628* (F); *3626*; *3630*; Mountains E. of Balsas, alt. ca. 3,200 m., *Osgood & Anderson 76*.

This taxon is distinct from all other Calceolarias in having the combination of unequal anther cells, large corolla, dense tomentose or lanate pubescence, large thickened leaf blades on long petioles and paired inflorescences, arising from only the uppermost pair of leaf-axils of the stems and branches.

Calceolaria sonchensis Pennell ex Edwin, Phytologia 19: 397. 1970.

Pubescent herb up to 50–60 cm. tall, stems square, sulcate-striate. Leaves bizarre, blades broadly ovate or triangular-ovate, 2.5–4.5 cm. long and 1.5–2.3 cm. wide, irregularly doubly dentate, apex acute, base truncate or broadly obtuse, petiolate, the uppermost excepted, these sessile, pubescent on both sides; petioles broadly winged, connate, widest at or near the stem, entire or minutely serrate, usually a little shorter than the blades; inflorescences in axils of upper leaves, cymose-dichasia; the lax pedicels ca. 23–33 mm. long, on peduncles up to 15 cm. long, usually exceeding 10 cm.; sepals ovate, 10–12 mm. long, acute or frequently acuminate, margins distantly or less often densely serrate, the teeth black, spinose; calyx tube very short, ca. 1 mm. long, calyx externally pubescent; corolla wholly glabrous, small for the genus, upper and lower lips subequal, ca. 7–8 mm. long and wide, the hooded upper lip completely covering the brown, divaricate, oblate anthers whose filaments do not exceed 1 mm. long; style ca. 2.5–3.5 mm. long, exceeding the stamens, ovary pubescent with short, erect hairs, ovoid or hemispherical, shorter than the style; capsule 2–3 mm. long, subhemispherical or broadly ovoid, tapering to apex, densely pubescent, loosely invested by the sepals.

Amazonas: Mountain south of Tambo de Ventilla, thin loam over clay banks, alt. 2,700–2,900 m., *Pennell 15791* (PH). The only collection known.

Close to *Calceolaria connatifolia* Pennell from which it differs in having mostly petiolate leaves, serrate sepals, and glabrous corolla with subequal lips, as well as in the general presence of pubescence and shape of the anthers.

Calceolaria sparsiflora O. Ktze., Linnaea 24: 228. 1851. *C. herrerae* Kränzl. and *C. herreae* var. *ramosissima* Kränzl. in Fedde, Rep. Sp. Nov. 27: 15. 1929.

Erect, branched shrub, main stem usually aphyllus, branches and branchlets often rectangular, new wood frequently drying light-yellow, puberulent with mixed glandular or eglandular, pustulate hair, occasionally sparsely eglandular-puberulent, then older wood glabrous, older wood usually puberulent as the younger but less densely so, wood ultimately devoid of hairs, only the red-pustulate bases remaining (muricate). Leaves variable in shape, size, and vesture, from narrowly cuneate-obovate to ovate, not infrequently lance-ovate or lance-obovate, 0.6–1.8 (–2.7) cm. long and 2–9 (–18) mm. wide, most frequently less than 2 cm. long and 3–8 mm. wide, usually densely beset beneath with gray-white pulverulent tomentum, occasionally lanate (sericeous) rarely glabrous or almost so, glabrous above, margin dentate or deeply dentate with usually distant teeth on the upper half to two-thirds, lower part of margin entire, narrowed to apex and base, base most often cuneate, usually on petioles 0.5–3.0 mm. long; petioles frequently villose; inflorescences simple to once-branched dichasia in the axils of upper leaves; flower stalks mostly puberulent, 10–20 mm. long, frequently 10–15 mm.; calyx lobes puberulent externally, pulverulent-puberulent internally, especially near the margins, ovate to oblong-ovate, 5–6 mm. long, acute; corolla yellow, up to 25 mm. long, often not exceeding 18 mm., sometimes only 13–15 mm. long, essentially glabrous, upper lip up to about half the length of the calyx lobes, lower lip saccate less than half its length, sac as wide as long or wider; stamens hidden under the lower lip, filaments short, anther cells equal, divaricate, up to twice as long as wide, each pair ca. 2.0–3.0 mm. long; style 1.5–2.0 mm. long, ovary glabrous to occasionally sparsely glandular; capsule with vesture as the ovary, oblong to narrowly ovoid, neck only little constricted, apically obtusish, equal to or more often longer than the calyx.

Cuzco: Paucartambo, steep, dry, stony slope, *Balls 6723*; Cerro Sapé, vicinity of Cuzco, stony ground, alt. 3,400–3,500 m., *Ferreyra 2664*; Alt. 3,300–3,500 m., *Herrera 527*; Sin. Loc. *Herrera 1704* (fragment of type of *C. herrae* var. *ramosissima* Pennell; Prov. Paucartambo, Hacienda Churu, *Herrera s.n.*; Sacsahuamán above Cuzco, alt. 3,500–3,600 m., *Pennell 13554*; San Sabastián, alt. 3,300–3,400 m., *Pennell 13598*; Ollantaitambo, alt. 2,900–3,000 m., *Pennell 13647*; Huancalli, alt. 3,400–3,500 m., *Pennell 13713*; E. of Pisac, alt. 3,200–3,500 m., *Pennell 13721*; Colquipata, alt. 3,200–3,500 m., *Pennell 13773*; SW. of Paucartambo, alt. 3,200–3,500 m., *Pennell 14169*; *14175*; Suburbs of Cuzco, *Soukup 48*; *128*; Alt. 3,400–3,500 m., neighborhood of Kenko or Choko, mixed data for *Vargas 230*; Sicuani, alt.

slopes 3,600–3,650 m., *Vargas 1472*; *9840*; Slopes of Chicon, alt. 2,800–2,900 m., *Vargas 1542*; *11066*.

Calceolaria subscaposa Edwin, Phytologia 19: 398. 1970.

Erect, annual herb, up to 20 cm. tall, stem with up to 3 pairs of leaves and unbranched or occasionally once-branched, rarely twice-branched, apically usually bearing 2 flowers when unbranched, or each apex 2-flowered when branched, rarely with a 3-flowered cyme at the apex, stems glabrous, internodes several times longer than the small leaves. Leaves petiolate, blades ovate in outline, up to about 1.0 cm. long and 0.8 cm. wide, usually sparsely puberulent above, thinly pulverulent beneath, margins dentate to with 2 pairs of dentate-denticulate lobes; petioles up to about half as long as the blade especially on the lowermost pair of leaves decreasing in size to the apex of the stem, puberulent; pedicels mixed glandular and eglandular-pubescent, mostly 3.5–5.5 cm. long; bracteoles occasionally developed near the base of the flower stalks; sepals glabrous, broadly ovate, acute, 4.5–5.0 mm. long and 3.8–4.2 mm. wide, margins entire, a little thickened; corolla yellow, 9–11 mm. long, upper lip glabrous, ca. 4 mm. long, lower lip not twice as long as the upper, sparsely red-gland-dotted proximally on the upper part of the sac that is about three-fourths the length of the ca. 7 mm. long lip; both anther cells fertile, both larger than the very short, thin connective; style ca. 1.5 mm. long; capsule from as long as to more often longer than the calyx, ovoid, basally ca. 4.5 mm. wide, abruptly narrowing to a neck about a third the length of capsule, sparsely gland-tipped pubescent, glands soon fugitive.

Known only from the copious type specimen.

Lima: Along Río Chillon, above Obrajillo, open rocky banks, alt. 2,800–3,200 m., *Pennell 14410* (PH).

No other taxon in this subgenus has the following combination of characters: subscapose stem, almost wholly pedicellate flowers, lower corolla lip less than twice as long as the upper and anther cells both fertile and separated by a very short connective.

Calceolaria tenuis Benth. in DC., Prodr. 10: 205. 1846.

Lax annual, stems glabrous below, puberulent to pubescent above, internodes much longer than the leaves that are most often small for the plant. Blades variable, usually subsimply lobate below, on longer petioles than the incised, subpinnatifid, occasionally

sessile upper leaves, lobes usually obtuse and toothed, blades ovate in outline, often not exceeding 3 cm. long and 2 cm. wide, varying to 5–6 cm. long, sparsely puberulent; flowers borne singly or in pairs in the upper leaf-axils, most often not exceeding 11 mm. long, frequently only 8 mm. long; pedicels up to 2 cm. long, glandular-pubescent; calyx lobes ovate, acute, 5–6 mm. long, glabrous or the entire to sparsely, finely toothed margins ciliate, veins 5–7, apparent on both surfaces; corolla yellow, glabrous or sparsely red-glandular, glands sessile, upper lip ca. 2 mm. long, lower 6–9 mm. long, saccate most of its length; anther connective enlarged, auriculate, larger, upper cell about as long as the connective, lower smaller, modified, fertile or sterile; style ca. 1.0–1.5 mm. long; capsule glabrous, conic-ovoid, much longer than the calyx, abruptly narrowed to a long neck.

Junin: Oxapampa, *Soukup 2417*.—Lima: Between Huaquicha and Palacala above Surco, alt. 2,600–2,700 m., *Ferreyra 3448*.

This taxon may be merely a depauperate form of *Calceolaria delicatula* Kränzl.

Calceolaria tetragona Benth. in DC., Prodr. 10: 218. 1846.

Erect, essentially glabrous shrub, differing from *C. cerasifolia* Benth. in the following ways: blade margins almost entire to sparsely serrulate; petioles usually not exceeding 1.3 cm. long; inflorescences few-flowered, corymbose; flower stalks longer, pedicels up to 2.5 cm. long; calyx ca. 7–8 mm. long, externally glabrous or sparsely puberulent, internally glabrous; corolla glabrous; anther cells unequal, 2–3 times longer than wide, septum and walls thickened, persisting; ovary and capsule often sparsely to densely glandular-puberulent.

Amazonas: Prov. Chachapoyas, *Mathews s.n.*; Cerro Puma-urcu, SE. of Chachapoyas, alt. 3,000–3,300 m., *Pennell 15671*; *15719*; Bank between Chincha and Tingo, alt. 2,400–2,500 m., along Río Sonche, E. of Molinopampa, *Pennell 15783*; Cerro de Fraijaco (Huani-Huni) NE. of Tambo de Ventilla, alt. 2,800–2,900 m., *Pennell 15840*; Alt. 3,400 m., *Pennell 15863*.—Cajamarca: Prov. Cutervo, trail between Socota and Tambillo, alt. 3,100 m., *Stork & Horton 10182*.—Piura: Chira, alt. 9,000 ft., *Carricker s.n.* (northernmost Peru, near Ecuador).

Calceolaria tomentosa R. & P., Fl. Peruv. 1: 15, *t. 22b*. 1798.

Tall, erect, perennial herbs, stems, flower stalks and lower surfaces of leaves densely lanate, hairs obscuring the tissue, the leaves

rarely lanate only on the venation. Petioles connate, widest at or near the stems, uppermost blades sessile, entire or minutely toothed; leaf blades ovate or triangular-ovate, size variable, up to 16 cm. long, mostly 5–11 cm. long and a little more than half as wide, coarsely doubly crenate, acute, bases truncate or broadly subcordate; flowers forming loose panicles or compound dichasia, from medium to very large; peduncles and pedicels ebracteolate, stalks decreasing in length toward the apex of the inflorescence; calyx lobes ovate, acute from 12–20 mm. long, densely pubescent on both surfaces, some of the inner surface hairs very short and arranged in a line near to and paralleling the margin; corolla glabrous, except for a tuft of long, white hair at the base of the lower lip, 17–33 mm. long, upper lip 4–6 mm. long, overtopping the genitalia, lower up to 32 (–35) mm. long, about a half to two-thirds as wide, sac (in life) inflated, about half the length of the lower lip, longitudinally ridged; anther cells unequal, usually twice as long as wide or longer, septa and walls thickened, filaments short, ca. 2–3 mm. long; ovary densely puberulent, style 4–6 mm. long, apically decurved; capsule ovoid, glutinous-puberulent, much smaller than the loosely investing sepals.

Material from northern Peru more densely lanate than the collections from Central Peru.

Close to *C. perfoliata* L. f. of Colombia from which it differs in anther cell and calyx lobe shape and in other details.

Amazonas: Taquia, E. of Chachapoyas, stream bank, alt. 2,300–2,400 m., *Pennell 15568*; Daguas on Río Sonche, east of Chachapoyas, alt. 2,400 m., *Pennell 15748*; Puente de Pipos, opposite Daguas, alt. 2,000–2,100 m., *Pennell 15752*; Gullied arroyo-side, above stream, 1–2 km. NE. of Chachapoyas, alt. 2,300–2,400 m., *Pennell 15897*; Lower slopes of Puma-rucu above Hda. Sta. Isabel, 1.5–2.0 km. SE. of Chachapoyas, alt. 2,400–2,500 m., *Wurdack 423*. —Cajamarca: mountain east of Celendin, alt. 2,600–2,700 m., *Pennell 15197*.—Huanuco: 6 km. north of Pillao, alt. 3,000 m., *Woytkowski 76*.—Junin: Between Tarma and Palca, alt. 2,600 m., *Killip & Smith 23373*; Carpapata, *Soukup 3437*; Between Palca and Carpapata, alt. 2,900 m., *Stork 10972*.—Lima (?): Between Tarma and San Ramon, growing with small shrubs above Carpapata, alt. 2,300–2,400 m., *Ferreyra 3738*; East of Huasahuasi, alt. 2,400–2,500 m., *Hutchison 1095*.—Piura: Chanchaqui, moist rocky banks, alt. 1,700–1,900 m., *Pennell & Ferreyra 14910*.—Sin. Loc.: *Ruiz & Pavon s.n.*

Calceolaria triloba Edwin, Phytologia 19: 399. 1970.

Climbing or erect shrub, wood densely tomentose when young, vesture decreasing with age, densely foliaceous on distant or close branches. Leaves subcoriaceous, broadly ovate in outline, less than 1 cm. long and wide, pilose above, densely lanate beneath, the vesture obscuring the tissue, margins little to very thickly revolute, with one pair of broad, basal, lateral lobes, these either divergent or somewhat antrorse, when divergent base of blade truncate, when antrorse base broadly ovate; costa and few secondary veins very deeply impressed above; flowers solitary or in 3-flowered dichasia, axillary in the upper parts of branches or terminal on the stem; flower stalks up to 2 cm. long, mostly shorter, less than 1 cm. long, densely tomentose; calyx externally pilose or puberulent, internally pilose or glandular-puberulent, glands shining red, elliptic to ovate, 4–5 mm. long and 2–4 mm. wide, acute; corolla yellow, often with 1 or 2 purple bands, externally glabrous or red-glandular and papillose, internally with a tuft of white hair at the base of the lower lip, upper lip minute, lower lip 14–18 mm. long, saccate more than half its length, sac abruptly flaring, globose, upturned; anther cells divaricate, equal, each pair 2–3 mm. long, more or less than twice as long as wide, filaments shorter than the thickened, 2–3 mm. long, apically curved style; capsule unknown.

Ancash: *Polylepis* thicket, alt. 3,500–3,700 m., mountain E. of Copa Grande, N. of Chancos, *Pennell 15371* (PH); Libertad: Open jalca above Motil, alt. 3,200 m., *Pennell & Ferreyra 14848*.

Two varieties, the typical and one other, might well be established for this taxon based on corolla vesture, amount of recurving of leaf margins, and calyx lobe shape. In view of the scanty material, the taxon is provisionally treated as composed of only one variety.

This taxon is close to *C. inaudita* Kränzl., which differs in having almost equal corolla lips, only barely lobed leaves, and reniform anther cells.

Calceolaria tripartita R. & P., Pl. Peruv. 1: 14, *t. 20a*. 1798. *C. heterophylla* Willd., Enum. Hort. Berol. 29. 1809. *C. scabiosaefolia* Roem. & Schult. in L., Syst. Veg. 1: 187. 1817. *C. chelidonioides* HBK., Nov. Gen. et sp. 2: 378. 1817. *C. mandoniana* Kränzl. in Pflanzenr. IV (257c): 30. 1907. *C. puru-puru* Kränzl. in Fedde, Rep. Sp. Nov. 27: 2. 1929. *C. tripartita mandoniana* Pennell, Proc.

Acad. Nat. Sci. Phila. 97: 175. 1945. *C. obscura* Pennell, Proc. Acad. Nat. Sci. Phila. 97: 176, *fig. 16a.* 1945.[1]

Very variable herb or vine, stems from prostrate to erect, when a vine often large, much-branched, occasionally extending to several meters long, stems typically glabrous below, increasingly pubescent toward the apex. Leaves petiolate, blades most often with 1–3 pairs of pinnae, pinnae larger from the base to apex of the leaf, terminal leaf-segments ovate, margins usually doubly dentate, teeth coarse, occasionally blades pinnatifid and pinnate or lobate or merely doubly dentate, the pinnae usually 1–3 cm. wide, the blade up to 15 cm. or longer, most often 4–8 cm. long, tissue glabrous to pilose on one or both surfaces; petioles from up to half as long as and thinly winged by the blade to almost or quite lacking, when present connate across the nodes, most often densely pubescent; flowers large for the subgenus, the lower 1 or 2 in axils of the branches and the upper typically in 3-flowered dichasia, occasionally cymose or 5–7-flowered subumbellate; pedicels mostly 2.0–4.5 cm. long, glandular-pubescent, often also glutinous; calyx lobes ovate, acute to acuminate, glandular-pubescent, 5–10 mm. long, margins often distantly minutely toothed; corolla yellow, pubescent at the orifice internally, upper lip 4–7 mm. long, lower 15–30 mm. long, saccate most of its length, sac inflated, about three-fourths as wide as long, non-saccate part of the lip abruptly narrowed; lower anther cell sterile, connective sigmoid, auriculate, most often longer than the cells; style 2.0–2.5 mm. long, gradually little tapering to a blunt apex.

The most commonly collected species in the subgenus and one of the most frequently encountered in the genus in Peru. Very variable in habit as well as in size of flower parts and leaf shape. It is best separated from the remaining species of the subgenus by a combination of large flowers, sterile anther cell, pinnae increasing in size from base to apex of each leaf and capsule most frequently broader than long. The leaf blades occasionally are less than 3 cm. long.

Generally distributed in wet sites from Piura to Cuzco, and probably further south.

The following citations are selected from the copious material.

Amazonas: Cerro Puma-urco, SE. of Chachapoyas, alt. 2,500–2,600 m., *Pennell 15508*; Utcubamba, S. of Chachapoyas, alt. 1,700–1,750 m., *Pennell 15588*; Along Río Sanche E. of Molinopampa,

[1] This is only a small part of the copious synonymy attached to the name. The selection is limited to those pertinent in Peru.

Streamlet at Chincha, alt. 2,400 m., *Pennell 15781*.—Ancash: Cerro in Río Fortaléza Valley, Lima–Huaraz road, W. of Comococha, alt. ca. 2,500 m., *Edwin & Schunke V. 3582*; Colcas, in stream and bog, alt. 2,500–2,600 m., *Pennell 15384*; Small stream above Yungay, alt. 2,650–2,700 m., *Pennell 15421*.—Apurimac: Prov. Abancay, 12 km. on road to Cuzco, ca. 5 km. NW. of Abancay, *Iltis & Ugent 627*.—Ayacucho: Pampalca, between Huanta and Río Apurimac, alt. ca. 3,200 m., *Killip & Smith 23274*; Mountains NE. of Huanta, alt. 3,100–3,200 m., *Weberbauer 7506*.—Cajamarca: E. side of Cerro Calla-Calla, below paramo, *Edwin & Schunke V. 3627*; Along stream E. of Cajamarca, alt. 2,600–2,700 m., *Pennell 15224*; Prov. Cutervo, in swamp, Río Sucse Valley, W. of Socota, alt. 2,800 m., *Stork & Horton 10115*.—Cuzco: Ollantaitambo, along stream, alt. 2,850–2,900 m., *Pennell 13669*; East of Cuzco City, on hills, alt. 3,500–3,800 m., *Pennell 13703*; Huancalli, alt. 3,400–3,500 m., *Pennell 13715*; Near Río Quencomayo, below Colquipata, alt. 3,200–3,300 m., *Pennell 13779*; Near Río Yanamayo, below "Pillahuata," alt. 2,000–2,200 m., *Pennell 14043* (type collection of *C. obscura* Pennell); Limatambo, alt. 2,100 m., *Vargas 232*; Macchu-picchu, Prov. Urubamba, alt. 2,000 m., *Vargas 815*; Pueblo Marcapata, Prov. Quispicanchis, alt. 3,200 m., *Vargas 4828*.—Huancavelica: Prov. Castrovirreina, near Cordova, alt. 3,020–3,300 m., *Metcalf 30289*; Hills N. of Pampas, Prov. Tayacaja, alt. 3,250 m., *Stork & Horton 10235*.—Huanuco: Carpish Pass, 84 km. from Tingo Maria, on highway to Lima, alt. ca. 2,750 m., *Allard 21112*; Quisca, alt. 2,050 m., *Scolnik 1042*; El Tambillo on road to Panao, alt. 2,650 m., *Scolnik 1054*; 6 km. S. of Huanuco, in dry stream bed of Huallaga River, alt. 1,920 m., *Stork & Horton 9377*.—Junin: Alongside ditch, near road, 1–3 km. E. of Palca, alt. ca. 2,000 m., *Edwin & Schunke V. 3920*; 2–4 km. E. of Huasahuasi, alt. 2,400–2,500 m., *Hutchison 1097*; At bridge, Canyon of Río Huasachuasi, below Huasahuasi, alt. ca. 2,400 m., *Hutchison 1139*; Prov. Cerro de Pasco, near Ataura, between Huariaca and Cerro de Pasco, alt. 3,000 m., *Hodge 6267*; Tarma, alt. 3,000–3,200 m., *Killip & Smith 21865;* Huacapistana, alt. 1,800–2,400 m., *Killip & Smith 24095*.—Libertad: Otuzco, alt. 2,830 m., "zapatos de la reina," *Angulo 0935*; Above Motil, alt. 3,000 m., *Pennell & Ferreyra 14845*.—Lima: Matucana, alt. 8,000 ft., sunny brook-margin, *Macbride 2935*; Along Río Chillón, above Obrajillo, alt. 2,700–3,000 m., *Pennell 14366*; San Buenaventura, alt. 2,800–2,900 m., *Pennell 14541*; At base of ocean-cliff, wet sandy soil, Barranca,

Pennell 15239; Hills S. of Surco, alt. 2,600–2,800 m., *Pennell & Ferreyra 15252*.—Piura: El Tambo, alt. 9,000 ft., *Carricker s.n.*, July 1, 1933; Cerro Porculla, 3–11 km. W. of continental divide, W. slope, *Edwin & Schunke V. 3739*.—Puno: Prov. Sandia, near Limbani, alt. 3,200–3,450 m., *Metcalf 30486*.

Calceolaria utricularioides Benth. in DC., Prodr. 10: 213. 1846. (ex. nomen. herb. Hooker.)

Soft annual herb, most often with unbranched stem, usually erect, less often reclining, stems descrete or few-clumped, rarely prostrate and rooting at the nodes, sparsely pubescent. Leaves few, mostly much shorter than the internodes, lower short-petiolate, upper sessile, usually ovate, entire, up to 2.5 cm. long, rarely longer and 6–12 (–18) mm. wide, sparsely pubescent on both surfaces; inflorescences usually few-flowered with 2 basal peduncles either once or twice, dicotomously branched or once or twice dichasiately branched; flower stalks pubescent or glandular-pubescent; calyx lobes ovate, up to about 3 mm. long; corolla yellow, lips from almost equal to the lower about a third longer than the upper; filaments about 5 times or more longer than the anthers; anther cells equal, divaricate, each pair about 1 mm. long and little narrower; style little longer than the stamens, thin, curving; fruit ovoid, longer than the corolla, sparsely puberulent or glandular-puberulent.

As seen below, this taxon has been sporadically collected over most of the length of Andean Peru, Piura to Arequipa. The species unquestionably occurs in the areas between the presently known stations and is probably one of the more common "slipper-flowers."

Amazonas: Cerro Puma-urcu, SE. of Chachapoyas, alt. 3,300–3,400 m., *Pennell 15696*.—Ancash: Yanac, alt. 11,000–12,000 ft., *Carricker s.n.*, March 28, 1932; Bolognesi, a little above Aquia, alt. 3,200–3,360 m., *Ferreyra 7517*.—Arequipa: Mollendo, *Hitchcock 22397*.—Cajamarca: SW. slope of Paso de Gavilán, S. of Cajamarca, alt. 2,700–2,750 m., *Pennell & Anderson 15102*.—Libertad: Usquil, Prov. Otuzco, alt. 3,000–3,100 m., *Ferreyra 7622*.—Lima: Huaquica, above Surco, alt. 2,600 m., *Ferreyra 693;* Between Huaquica & Palacala, alt. 2,600–2,700 m., *Ferreyra 3442;* Along Río Chillón, above Obrajillo, alt. 2,600–2,800 m., *Pennell 14359*; San Buenaventura, alt. 2,700–2,900 m., *Pennell 14530*; S. of Surco, alt. 2,400–3,000 m., *Pennell & Ferreyra 15246*; Huillacachi by Matucana, alt. 3,300 m., *Weberbauer 5726*.—Piura: Porculla, *Carricker s.n.*, May 21, 1933.—Sin. Loc.: *Weberbauer 6991*.

Calceolaria variefolia Edwin, Phytologia 19: 400. 1970.

Divergently branching shrub, wood and flower stalks appressed-puberulent, branches opposite, distant, main stem aphyllus or almost so. Leaves ovate, sometimes very broadly ovate, 2.5–6.0 cm. long and 0.8–4.0 cm. wide, usually 4–5 cm. long, acute at apex, obtuse to almost acute at base, margin subentire to subdistantly serrulate-serrate, puberulent above, red-punctate beneath, punctations a little impressed or on the surface, very short petiolate to subsessile; petioles 0.3–2.0 mm. long, thickened; inflorescences 3-flowered dichasia in the axils of the upper pairs of leaves; flower stalks up to 1.5 cm. long, usually a little shorter; calyx lobes pubescent on both surfaces, especially on and near the margins, ovate, 4–5 mm. long and ca. 3.0–3.5 mm. wide, obtuse; corolla yellow, glabrous, ca. 16–18 mm. long, upper lip reduced to a ring, ca. 1.0–1.5 mm. long, lower lip saccate less than half its length; filaments short, equally thickened base to apex, anther cells less than twice as long as wide, equal or a little unequal; style ca. 2 mm. long; ovary densely red-glandular; capsule unknown. Only the type collection thus far seen.

Piura: Rocky bank above Canchaqui, alt. 1,700–1,900 m., *Pennell & Ferreyra 14916* (US).

Differs from *Calceolaria boliviana* (Britton ex. Rusby) Pennell, in having much smaller flowers with ovate calyx lobes as opposed to lanceolate lobes and short style, ca. 2 mm. long, as opposed to 6–8 mm. and the vesture and branching habit differ.

Calceolaria velutinoides Edwin, Phytologia 19: 401. 1970.

Erect, branched shrub, wood, except the main stem and flower stalks, densely lanose-tomentose, main stem glabrate, wood usually drying light brown. Leaves short-petiolate, densely matted-pilose-tomentose above and on the veins beneath, orange-red puncticulate beneath and sometimes sparsely so above, ovate, usually not exceeding 2.0 cm. long and most often 1.0–1.2 cm. wide, a few longer and occasionally narrower, margins a little thickened, crenulate to entire, apex acute, base subobtuse; flower stalks mostly not exceeding 1.3 mm. long; inflorescences corymbose-dichasia, usually once branched, few-flowered, terminal or axillary in upper leaves; calyx lobes externally pilose and red-puncticulate, internally with a row of white hairs along the margins and at the acute to short-acuminate apex, ovate, ca. 6 mm. long and 4 mm. wide; corolla yellow, glabrous, 8–12 mm. long, upper lip reduced to a narrow ring, lower saccate less than half its length, almost as wide as long; filaments less than 2 mm. long,

anther cells equal, divergent, usually 2–3 or more times longer than wide, occasionally only ca. 1.8 times; style ca. 2 mm. long, little if at all thickened; ovary glabrous to glandular-pustulate; capsule not seen.

Amazonas: Cerro Puma-urcu, SE. of Chachapoyas, shrub on and near rocks, alt. 3,100–3,200 m., *Pennell 15555* (US); Cerro Puma-urcu, SE. of Chachapoyas, rocks near base of cliff, alt. 3,300–3,400 m., *Pennell 15695*.

Close to *C. croceopunctata* and *C. rugulosa* Edwin, differing from the former in inflorescence structure, style length, and in lacking an acumin at the apex of the septum separating the anther locules and from the latter in having much smaller leaves and shorter petioles, simpler inflorescences, and also glabrous corolla with longer sac.

Calceolaria verticillata R. & P., Fl. Peruv. 1: 17. 1798. *C. multiflora* Cav., Icon. 5: 29, *t. 449*. 1799. *C. gemelliflora* Cav., Icon. 5: 30, *t. 450. f.1*. 1799. *C. angustiflora* Hook., Bot. Mag. *t. 3094*. 1831.

Shrubby, much-branched, up to 50 cm. tall and even taller. Stems sparsely, branches densely setose. Leaves opposite or less often ternate from the base to the middle of the stem, always ternate on branches and upper stem, ovate, size very variable, from about 1.5 cm. to 6 cm. long and 0.6–2.8 cm. wide, those of the stem much bigger than those on the branches, usually sparsely pubescent above and densely beneath, sometimes glabrous or almost so, apex acute, base much wider, margins dentate to doubly dentate, blades short-petiolate; inflorescences paniculate, often interrupted; bractlets reduced, foliose; flower stalks more or less densely puberulent; calyx-lobes lanceolate to lance-acute, 3–4 mm. long, glabrous to sparsely setose, margins entire, sometimes fimbriate; corolla yellow, externally papillose, upper lip minute, lower 9–15 mm. long, saccate less than half its length, proximal part abruptly narrower than the saccate, distal part; anther cells equal, divaricate, papillose, each pair ca. 2.5 cm. long, ca. 1.5 times longer than wide; style 1.5–4.0 (–5.0) mm. long; ovary beset with gland-tipped hair; capsule with vesture as the ovary, ovoid in outline, usually much longer than the calyx, upper half abruptly constricted, beak-like, style persisting.

A commonly collected, well marked taxon, especially frequent in and near the Department of Lima.

The citations below have been selected from the copious material in major herbaria.

Ancash: Rocky jalca, Cerro Shaurema, SE. of Huaraz, alt. 3,200–3,300 m., *Pennell 15293.*—Arequipa: Quéquena near Arequon, alt. 8,000 ft., *Stafford 295;* Characato, alt. 2,400–2,600 m., *Vargas 8045.*—Cajamarca: Chaupe, alt. 5,500 ft., *Carricker s.n.,* July 21, 1933.—Junin: Huancayo, alt. 3,317 m., *Soukup 2770;* Incahuasi, alt. 4,200 m., *Soukup 3202.*—Liberyad: Cerro Campana, Prov. Trujillo, alt. 550 m., *Lopez 0387.*—Lima: Huayopampa, Prov. de Canta, *Ferreyra 2000;* Valley of Río Rimac, near Lima–Aroya road at Km. 90, E. of Lima, alt. 3,000 m., *Goodspeed & Weberbauer 33058;* Matucana, *Macbride 2905;* Along Río Chillon, near Obrajillo, alt. 2,200–2,500 m., *Pennell 14320;* Canta, open rocky slopes, alt. 2,700–2,900 m., *Pennell 14329;* San Buenaventura, alt. 2,700–2,800 m., *Pennell 14520;* S. of Surco, rocky granitic banks, alt. 2,300–2,600 m., alt. *Pennell & Ferreyra 15241;* Cerro Jeronimo, *Soukup 1612;* Lamboraque, alt. 3,008 m., *Soukup 4234.*—Moquegua: Rainy-green formation, Carumas, alt. 3,100 m., *Weberbauer 7289.*

Calceolaria virgata R. & P., Fl. Peruv. 1: 20. *t. 31. fig. a.* 1798.

Erect shrub with virgate branching, branches, and stem pubescent. Leaf blades subsessile to short-petiolate, opposite or less often ternate, ovate, 1.2–4.0 cm. long and 0.6–1.8 (–2.2) cm. wide, most often pubescent on both surfaces, occasionally only on veins beneath, margins serrate, apex acute to subobtuse, narrowed to base; petioles on the stems often thickened at base, woody and connate; inflorescences irregularly cymose, corymbose or subumbellate, usually arising from the axils of upper leaves, several on each branch; flower stalks usually glandular-pubescent; calyx lobes broadly ovate, 5–7 (–10) mm. long, acute, externally more or less, densely pubescent corolla yellow, mostly 9–15 mm. long, glabrous, upper lip shorter than the calyx, lower lip saccate less than half its length; filaments short, anther cells equal, divaricate, more than to less than twice as long as wide; style 1.5–4.0 mm. long; ovary usually glandular; capsule ovoid, abruptly narrowed to a short neck, about as long as the calyx or little longer, glandular-punctate, glands golden-yellow.

Leaf blades pubescent beneath on tissue and veins; calyx lobes 5–7 mm. long; style 1.5–2.5 mm. long . . . . . *C. virgata* f. *virgata*

Leaf blades pubescent beneath on veins only; calyx-lobes 7–10 mm. long; style 3–4 mm. long . . . . . *C. virgata* f. *llamaensis.*

Calceolaria virgata R. & P. f. **virgata.** *C. extensa* Griseb., Symb. Ant. 238. 1879; non Benth.

This taxon is the most commonly collected *Calceolaria* in the subgenus *Cheiloncos*, only *C. tripartita* R. & P. in the subgenus *Calceolaria* is better represented in herbaria. Specimens seen from Piura and Cajamarca in the north to Arequipa and Puno in the south.

The citations below have been selected from the copious material.

Ancash: Yanac, 12,000–13,000 ft., *Carricker s.n.*; Matarragra, cerro NW. of Chiquián, alt. 2,560–3,520 m., *Ferreyra 5600*; S. of Huaraz, alt. 3,100–3,200 m., *Pennell 15264*; *15302*; N. of Chancos, alt. 3,200 m., *Pennell 15318*; Paso de la Fortaléza, alt. 3,800–3,850 m., *Pennell 15389*; W. slope of Cordillera Negra, below Paso de Collán, alt. 3,560 m., *Pennell 15474*.—Apurimac: Quishuala, alt. 11,900 ft., *Balls 6902*.—Arequipa: Mollendo, *Hitchcock 22396*.—Ayacucho: Pampalca, alt. ca. 3,200 m., *Killip & Smith 22249*.—Cajamarca: Cajabamba, *Carricker s.n.*; Bajando, summit of el Gavilán, Contumázá Prov., alt. 3,200 m., *Ferreyra 3332*; Mtn. E. of Celendin, alt. 2,700–2,900 m., *Pennell 15194*; NE. of Cajamarca, alt. 2,600–2,700 m., *Pennell 15229*; Encoñada, alt. 3,000 m., *Pennell & Reichlin 15028*.—Quinuamayo, alt. 3,500–3,600 m., *Pennell & Reichlin 15058*; Vicinity of Celendin, alt. 2,625 m., *Woytkowski 3*.—Cuzco: Paucartambo, alt. 11,500 ft., *Balls 6825*; Sacahuamán, above Cuzco, alt. 3,500–3,600 m., *Pennell 13568*; Coraupampa, between Cuzco and Pisac, alt. 3,400–3,500 m., *Pennell 13710*; Colquipata, alt. 3,500–3,700 m., *Pennell 13770*; Chincheros, alt. 3,700 m., *Vargas 1535*; Québrada de Llulluchayocc, alt. 3,400 m., *Vargas 4291*; Marcapata, Quispicanchis Prov., alt. 3,200 m., *Vargas 4829*; Amaru, Pisac, alt. 3,500 m., *Vargas 5025*; Calca Prov., alt. 3,100–3,200 m., *Weberbauer 7899*.—Huancavelica: Near Córdova, Castrovirreina Prov., alt. 3,050–3,300 m., *Metcalf 30253*.—Junin: Between Viques and Ingahuasi, S. of Huancayo, alt. 3,150 m., *Killip & Smith 22165*; Carpapata, above Huacapistana, alt. 2,700–3,200 m., *Killip & Smith 24369*; Mito, ca. 9,000 ft., *Macbride & Featherstone 1456*; Huancayo, Québrada Occopilla, *Soukup 3629*.—Libertad: Above Motil, Km. 96, between Trujillo and Huamacucho, *Ferreyra 3016*; Agallpampa, alt. 3,050 m., *Lopez 0874*; 2–3 km. above Huamacucho, alt. 3,200 m., *Pennell & Ferreyra 14869*; Santiago de Chuco, alt. 3,150 m., *Stork & Horton 9946*.—Lima: Río Blanco, Huarochiri Prov., alt. 3,600 m., *Asplund 11389*; Above Surco, near Llacllighi, alt. 2,500–2,800 m., *Ferreyra 687*; Below Oyón, Cajatambo Prov., alt. 3,200–3,300 m., *Ferreyra 3543*; Matucana, alt. ca. 8,000 ft., *Macbride & Featherstone 109*; Along Río Chillón, above Obrajillo, alt. 2,600–2,800 m., *Pennell*

14357; San Buenaventura, alt. 2,700–2,900 m., *Pennell 14540*; near Antaicocha, Cerro Colorado, E. of Canta, alt. 3,200–3,900 m., *Pennell 14626*; Huaros, alt. 3,300–3,600 m., *Pennell 14717*.—Pasco: Between Salcachupán and Cerro de Pasco, alt. 3,400 m., *Ferreyra 6600*.—Piura: Canchaque, *Soukup 4680*.—Puno: Ollachea a Pte. Ackopampa, Carabaya Prov., alt. 3,100 m., *Vargas 6970*.

Calceolaria virgata f. **llamaensis** Edwin, Phytologia 19: 405. 1970.

Herb or shrub differing from the typical form in the following ways: leaf blades pubescent beneath on the veins only; calyx lobes 7–10 mm. long; style 3–4 mm. long; petioles very short, hardly 1 mm. long.

Cajamarca: Herb, open bank, below Llama, alt. 1,850 m., *Pennell 15914* (PH); Shrub, banks and rocks, Llama, alt. 1,900–2,400 m., *Pennell 15919*.

Calceolaria viscosa R. & P., Fl. Peruv. 1: 18, *t. 30. fig. a.* 1798.

Small branched shrub, upper part sometimes soft and declining, wood puberulent, internodes usually longer than the leaves, entire plant red-resinous dotted. Leaves very short-petiolate; petioles 1–2 mm. long or almost wanting, sometimes with abbreviated shoots in the axils and the leaves appearing verticillate; blades glabrous, ovate, mostly 2.1–4.0 (–5.3) cm. long and 1.0–1.8 (–2.2) cm. wide, usually few- and irregularly serrate, acute at apex, less so at base, veins sometimes obvious beneath; inflorescences several flowered corymbs or twice branched dichasia, in axils of upper and uppermost leaves; calyx lobes ovate, 5–6 mm. long, acute, externally pubescent, corolla yellow, 17–20 mm. long, externally minutely puberulent, especially on the margins, upper lip 2–3 mm. long, lower lip 15–17 mm. long, saccate less than half its length and sac 8–9 mm. wide, wider than long; filaments short, anthers large for the narrow corolla base, 2.0–2.5 mm. long, at least twice as long as wide; style 2–3 mm. long, ovary dark red when dry, hemispherical, shorter than the style; capsule unknown.

Ancash: Around Cerro de Chiquián, Prov. Bolognesi, alt. 3,100–3,600 m., *Ferreyra 5683*; *7296*; *7340*.

Fragments of Ruiz and Pavon and Dombey collections from Lima and Tacna were also studied. The disjunction between the Ancash–Lima and Tacna material strongly suggests that the species may be expected to occur between these departments.

Calceolaria vulpina Kränzl. in Engler, Bot. Jahrb. 54: Beibl. 119, 18. 1916.

Plant erect, shrubby and branched or unbranched, stem densely beset with septate hair and often glandular above, drying dark brown, 4-angled above, terete below. Leaves narrowly ovate or rhomboidal, up to 6 cm. long and 2.8 cm. wide, at least twice as long as wide, pubescent with septate hair on both surfaces, especially toward the apex, upper sessile, lowest on petioles up to 8 mm. long, margins dentate on upper two-thirds, entire on lower third, teeth obtuse, becoming acute on upper leaves, apex acute; inflorescences in pairs from uppermost leaf-axils, usually bifurcately branching and often ultimately subcorymbose; flower stalks and calyces densely glandular-pubescent, hair septate or not; calyx lobes ca. 1 cm. long and 4 or 5 mm. wide, little dimorphic, the uppermost lobe wider than the others; corolla yellow, glabrous, velvety near the orifice of the lower lip, upper lip 4–6 mm. long, lower 18–24(–28) mm. long and ca. half as wide, saccate more than three-fifths of its length; anther cells equal, divaricate, each pair 3–4 mm. long, about twice as long as wide; ovary densely pubescent and glandular-pubescent; capsule ovoid, shorter than the calyx, vesture as the ovary.

Junin: Between Viques and Ingahuasi, Mantaro Canyon, S. of Huachacayo, alt. 3,150 m., *Killip & Smith 22143*; Between Tocas and Pilcos, near Colcabamba, Prov. Tayacala, alt. 1,900 m., *Ochoa 978*; Prov. Huancayo, alt. 3,600 m., *Rauh–Hirsch P1708*; Chongos Bajos, *Soukup 3620*.

Calceolaria weberbaueriana Kränzl. in Fedde, Rep. Sp. Nov. 1: 101. 1905.

Shrub, erect, with the stem much branched from near the base, branches usually very numerous, short, strict, sparsely to densely lanate base to apex. Leaves oblong, obtuse, reaching almost 1 cm. long and about 2.5 mm. wide, tissue obscured by the silvery white, lanate pubescence; inflorescences pseudo-paniculate; peduncles up to 2 cm. long, densely pubescent; calyx lobes ovate, 3–4 mm. long and 2.5 mm. wide, densely lanate externally; corolla purple or yellow and purple, upper lip about as long as the calyx, densely pilose, lower lip 10–12 mm. long, glabrous, saccate about half its length; anther cells subhemispherically unequal, a little longer than wide; style longer than the stamens, basally pilose, ca. 5–6 mm. long; ovary elliptic-ovoid, densely lanate; capsule narrowly ovoid, longer than the calyx, lanate, style persisting.

Libertad: Toyabamba, among timberline scrub, alt. 11,000 ft., *Carricker s.n.*, April 14, 1942; Bombamarca, W. slope of E. cordillera, 11,000 ft., *Carricker s.n.*, July 8, 1932.

Type collected in Ancash (*Weberbauer 3248*) which borders Libertad.

Purple flowers are rare in the genus.

CAPRARIA L.

Xuarezia, R. & P., Syst. Veg. 46. 1798; Fl. Peruv. 2: 13, *t. 123a*. 1799.

References: Sprague, T. A., Kew Bull. pp. 205–212. Sept. 19, 1921.

Erect shrubs or occasionally subshrubs, rarely herbs (*Hought 192*), usually branching, stem terete, glabrous or pubescent with stiff hairs, especially above. Leaves alternate, usually serrate or dentate, occasionally entire, narrowly elliptic to narrowly obovate or ovate, occasionally lanceolate, sessile or very short-petiolate, gland-dotted; inflorescences 1 or 2 in each axil; flowers racemose, pedicellate; calyx of 5, rarely 4, imbricate, free sepals or the narrowly lanceolate sepals fused only at the base; corolla 4-lobed, yellow-green or white, actinomorphic or barely zygomorphic, tube short, rotate or almost so; stamens 4 or 5, when 4, didynamous, inserted on 2 of the anterior corolla lobes, filaments filiform, anthers subsagittate, locules distinct, parallel or divergent; ovary bilocular surrounded by the nectary, style one, stigma lobes ligulate; capsule septicidal, splitting dorsally at least part way, ellipsoid, gland-dotted; seed numerous, testa reticulate.

The genus comprising five species, is found from Texas through Central America and the West Indies to South America in Peru, Argentina, and Bolivia, thence East to Brazil. *C. biflora* L. has been introduced into and has naturalized in the Bahama Islands and the Gold Coast, Mauritius, and Cape Verde Islands in Africa. The main concentration of the genus is in Mexico.

Formerly *C. biflora* and *C. peruviana* Benth. were widely employed as a beverage by the aborigines as well as early European settlers throughout much of their natural ranges. The introduction of the former species spread the use of this "tea" to other parts of the world. *C. biflora* is used today, but in lesser amounts. Two of the five species occur in Peru.

Leaf blades mostly lance-elliptic, narrowly elliptically ovate or lanceolate, often 6–8 times longer than broad, margins variously ser-

rate, or subentire, sinuses usually lacking or very small; stamens 5; corolla actinomorphic; sepals usually less than half as long as the capsule..... *C. peruviana.*

Leaf blades broader than the above, mostly oblanceolate or obovately oblanceolate or narrowly obovate, 2–4½ times longer than broad, margins variously dentate to subincised, sinuses frequently present and apparent; stamens usually 4, inserted in approximate pairs on 2 of the anterior lobes of the slightly zygomorphic corolla; sepals free and often as long as or longer than the capsule..... *C. biflora.*

Capraria biflora L., Sp. Pl. 875, 1753; Jacq., Hist. 182, *t. 115.* 1763; Ill. *t. 534. fig. 2*; HBK., Nov. Gen. et Sp. 2: 354. 1817; Loesener in Engler, Bot. Jahrb. 23: 120. 1896. *Capraria lanceolata* Vahl., Encyl. 2: 47. 1798; *C. semiserrata* Willd., Sp. Pl. 3: 325. 1800; *C. hirsuta* HBK., Nov. Gen. 2: 355. 1817 *C. semiserrata* var. *berterii* (A. DC.) Benth. in DC., Prodr. 10: 429. 1846; Millsp., in Field Mus. Publ. Bot. 2: 98. 1900; *C. mexicana* Griseb., Fl. Brit. W. Ind. 427. 1861, non Moric.

Branching shrub, stems hirsute, hairs of various lengths, longitudinally striatulate. Leaves narrowly obovate, up to 5.4 cm. long and 1.2 cm. wide, mostly shorter and narrower, ca. 3.5 cm. and 0.9 cm., apex acute or subacute, sessile or short-petiolate, the petiole thinly winged by the tapering blade, margins often pubescent, variously dentate on the upper third to a half of the blade, rarely subincised, frequently sinuses present between the teeth; pedicels frequently sparsely hirsute, 5–7 mm. long (rarely little shorter), erect or almost so; calyx tube usually lacking, if present up to 0.8 mm. long, sepals sometimes sparsely hirsute, 4–6 (–7) mm. long and 1.0–1.5 mm. wide, narrowly lanceolate; corolla white, subrotate, ca. 12–15 mm. in diameter, the free part of the ca. 8–9 mm. long petals elliptical and about 5.0–5.5 mm. long, subacute; stamens 4, didynamous, inserted in pairs anteriorly, the insertion of the longer pair lower on the corolla tube; filaments about 3 times longer than the 1.2 mm. long, dorsifixed anthers; ovary drying black, shorter than the 3 mm. long style, stigma ligulate, lobes at least partly free, less than 1 mm. long, much shorter than the style; capsule broadly ovoid, subtruncate, 4–8 mm. long; seeds numerous, drying dull brown, less than 1 mm. long, the brown to black placenta forming a thick column.

Loreto: San Salvador on the Amazon River, *Ll. Williams 1564*: Leticia on the Amazon River, *LL. Williams 3070.*

In the western hemisphere from the Bahama Islands to Argentina, including the West Indies and Central America. Rare in western South America. Known vernacularly by many names outside of Peru, none reported within. Cultivated in Colombia as Té Nacional.

Capraria peruviana Benth. in DC., Prodr. 10:430. 1846; Robinson in Proc. Amer. Acad. 38: 202. 1902; Stewart, in Proc. Calif. Acad. Sci. 1: 141. 1911. *Xuaresia biflora* R. & P., Syst. Veg. 46. 1798; Fl. Peruv. 2: 13, *t. 123a.* 1799. *Witheringia salicifolia* Hook., Bot. Misc. 2: 231. 1831.

Erect shrubs or subshrubs, or herbaceous to 1.5 m. tall, stems drying light to dark brown, glabrous and usually longitudinally striatulate. Leaves glabrous, narrowly elliptic, occasionally lance-subovate or narrowly lanceolate, tapering to a long, acute apex, base gradually tapering to a short, narrowly winged petiole, the blade appearing sessile or almost so, up to about 6 cm. long and 0.8 cm. wide, usually shorter and a little narrower variously serrate, occasionally serrulate on upper third or subentire or entire, sinuses lacking; pedicels glabrous, mostly 8–12 cm. long; calyx tube very short, 1–2 mm. long, lobes narrowly lanceolate, ca. 3–5 mm. long and 1.0–1.5 mm. wide; corolla pale green-yellow, rotate, about 12–14 mm. in diameter, free part of the similar, 6–7 mm. long petals elliptically subovate, the costa sometimes extending as a very short apiculum at the little narrowed apex; stamens 5, inserted on the posterior and lateral corolla lobes, very near the base, filaments 2–3 times longer than the 1.0–1.3 mm. long, dorsifixed anthers; ovary ovoid, drying black, about twice as long as the style and half the length of the petals, stigmas ligulate, the lobes at least partly free, almost as long as the style; capsule ovoid or broadly ovoid, 6–12 mm. long; seeds numerous, light to dark brown, less than 1 mm. long, the black placenta forming a thick central column.

Lima: Prov. Lima; Banks of Río Rimac, 20–50 m., *Esposito 14796*; Lurin, Moist open soil, alt. 5–20 m., *Pennell 12209*.—Piura: Pariñas Valley, *Haught 192* (near the westernmost point of South America); Sin. Depart.: Caña Dolce, watercourse, *Haught F-109*.

From Panama to Peru and Ecuador. Vernacularly known as Té del Peru; Té de Lima.

Although Hemsley (Biol. Centr.-Amer. Bot. 2: 455. 1882) has considered this species conspecific with the preceding, it is generally agreed that they are distinct.

The remaining three species of *Capraria*, *C. mexicana* Moric. ex Benth., *C. integrifolia* Mart. et Gal., and *C. saxifragaefolia* C. & S. (*C. frutescens* Britt.) have not yet been found south of Panama. The latter two known only from Mexico and Honduras.

CASTILLEJA Mutis.

Herbs or rarely subshrubs, erect or occasionally repent or prostrate and matted, usually branched, glabrous or pubescent. Leaves alternate, the crowded uppermost occasionally appearing opposite, narrow, entire, often few-lobed or divided, sessile or almost so; inflorescences spikes or racemes; flowers sometimes dull, often crowded near the apex, distant beneath, subtended by brightly colored, usually strongly modified bracts; calyx tubular, laterally compressed, deeply cut above, or above and beneath, lobes entire or bifid; corolla with tube included, bilabiate, upper (posterior) lip galeate of 2 united lobes, entire, erect, elongated, concave, lower lip (much) smaller, 3-lobed, lobes very short to long; stamens 4, didynamous, with the style and stigma included in the galea; anther sacs oblong-linear, unequally placed, upper modifixed, lower attached to the filament near its apex; style filiform, stigma bilobed or entire; capsule loculicidal, ovate or oblong, sometimes oblique; seeds numerous, testa loose, reticulate.

The genus comprises about 210 species one of which is found in northern Asia. Commonest in western North America and Mexico extending north to Canada and south to Chile and Argentina. Nine species have been found in Peru.

1. Calyx cleft medianly subequally above (posteriorly) and beneath (anteriorly).
   2. Stigma lobes wholly united, capitate or punctiform; plants erect, caespitose or dwarfed.
      3. Lateral cleavages of the calyx well developed, lobes lance-attenuate; plants erect, stems few.
         4. Lateral cleavages of the calyx 3–5 mm. long, lobes equal, lanceolate-attenuate, acute; bracts usually with 3 pairs of lobes ..... *C. pseudopallescens.*
         4. Lateral cleavages of the calyx 1.5–2.5 mm. long, lobes subequal, deltoid or ovate, acute, bracts usually with 2 pairs of lobes, sometimes only 1 pair ..... *C. cerroana.*

3. Lateral cleavages of the calyx minute to lacking, lobes rounded-obtuse; plants caespitose or dwarfed. . . . *C. pumila.*

2. Stigma lobes free, plants usually erect, elongate or if clumped, stems few.

5. Calyx shorter than the exserted corolla. . . . . *C. arevensis.*

5. Calyx longer than the included corolla. . . . . *C. communis.*

1. Calyx cleft medianly very unequally posteriorly and anteriorly.

6. Bracts broadly ovate in outline, much shorter than the flowers, 3-lobed on the upper half, the lobes redividing into 3 pairs; matted dwarf. . . . . *C. bracteata.*

6. Bracts lanceolate or narrowly ovate in outline, usually as long as or longer than the flowers, with 1 or 2 pairs of lobes, some from the lower half of the blade; plants erect, elongate.

7. Lateral cleavages of the calyx a quarter to a half as deep as the median; flowers sessile or pedicellate (in fruit). *C. fissifolia.*

7. Lateral cleavages of the calyx minute or wanting; flowers short-pedicellate.

8. Calyx 27–30 mm. long, lobes laterally retuse or emarginate; corolla 28–34 mm. long, usually little exceeding the calyx. . . . . *C. virgata.*

8. Calyx 15–17(–21) mm. long, lateral cleavages wholly lacking; corolla 20–24 mm. long, well exserted. . *C. virgatoides.*

Castilleja arvensis C. & S., Linnaea 5: 103. 1830.

Erect, hispid-pilose, much branched annual. Leaves sessile, spathulate or oblong-lanceolate, up to 6 cm. long and usually less than 1 cm. wide, reaching 1.5 cm. wide on the longest, entire, apex obtuse, narrowed to base; spikes dense above, interrupted below; bracts entire, obovate-oblong, wider than the stem leaves, red-tipped; flowers sessile; calyx 9–13 mm. long, cleft subequally above and beneath or a little more deeply above, the two lobes entire, subobtuse, truncate or emarginate, the ventricose tube a little shorter than the lobes; corolla up to 15 mm. long, the tube and throat included in the calyx, galea green or yellow-green, concave, externally puberulent, apex entire, acute, when flattened broadest at the middle and sharply tapering to both ends, lip subobsolete, weakly saccate, the 3 lobes short-acuminate; anthers linear, stamens subequal to the

galea in length; stigma bilobed with the style a little longer than the stamens; capsule black when dry, broadly ovoid-oblong, oblique, seeds numerous, the testa reticulate, much exceeding the seed body at both ends.

Ancash: Lachay 90 km. north of Lima, alt. 500 m., *Rauh-Hirsch P61*.—Apurimac: Prov. Abancay, Laderas de fruitius, alt. 2,800 m., *Marin 1862*.—Arequipa: Tingo, moist tilled soil, 2,100–2,300 m., *Pennell 13101*.—Cuzco: Ollantaitambo, moist tilled soil, 2,850–2,900 m., *Pennell 13672*; Macchu-picchu, alt. 2,000 m., *Rauh-Hirsch P846*.—Junin: Mito, cornfield, alt. ca. 9,000 ft., *Macbride & Featherstone 1609*.—Lima: Matucana, southern slide rock slope, about 8,000 ft., *Macbride & Featherstone 338*; Along Río Chillón, near Obrajillo, open grassy hillside, 2,300–2,500 m., *Pennell 14322*.—San Martin: on road to Divisoria, 59 km. from Tingo Maria on highway to Pucallpa, about alt. 8,500 ft., *Macbride & Featherstone 1316*.

The commonest species in Central America and Mexico, extending southward to Colombia, Venezuela, and Bolivia then eastward to Brazil (Minas Gerais).

Castilleja bracteata Edwin, Phytologia 19: 402. 1970.

Densely matted, dwarf, perennial herb, up to 5 cm. tall, from a knob-like root-stock. Stems obscured by the leaves that are longer than the internodes, puberulent and angled; leaves narrowly lanceovate or -oblong, minute to about 1.5 cm. long, usually with 1 or a pair or 2 pairs of short, linear or narrowly lanceolate lobes, mostly from the upper part of the blade, occasionally entire, viscid, puberulent-ciliate on the margins, sessile, acute, little or sometimes not at all narrowed to base; inflorescences short, dense spikes; bracts 11–14 mm. long, margins ciliolate, broadly ovate in outline, divided from about the middle into 3 divisions, the lateral divisions usually dividing once again, the median once or twice, lobes lanceolate, acute, decreasing in length from primary to secondary and tertiary, drying green (red-tipped?); flowers (and fruits) sessile; calyx red-tipped or green, broadest at the apex, regularly, slightly tapering to the base, subcylindric or subsalverform, 13–18 mm. long, puberulent on the main veins and tissue above on both surfaces, ciliolate-puberulent on the margins, lobes obtuse, median cleavages very unequal, about a fourth the length of the calyx (above) posteriorly and half way (below) anteriorly, lateral cleavages lacking or the lobes merely retuse or emarginate; corolla 15–24 (–26) mm. long, exceeding the calyx, at least part of the galea exserted, usually up to a half its

length, galea densely puberulent externally, often red-green, 6–10 mm. long, margin thickened, inrolled, lip very short, included in the calyx, the 3 lobes lanceolate, hardened, infolded, sac moderately developed; stamens didynamous, pairs almost equal in length, the longer pair 1–2 mm. shorter than the galea, included; style and stigma about reaching the longer stamens, stigma lobes capitate-punctiform, wholly united; capsule narrowly ovoid or oblong, 12–14 mm. long, oblique near the acuminate apex; seeds numerous, loosely enveloped by the reticulate testa, reticulations dark.

Cuzco: Prov. Calca, Pisac, prados humedos, alt. 3,400 m., April, 1943, *Marin 252*.

This well-marked species, especially as to habit and the lobing of the bracts is also technically unique not fitting into any section of the genus thus far described.

Castilleja cerroana Edwin, Phytologia 19: 403. 1970.

Erect, pubescent, little branching, perennial herb, 40 cm. tall. Stem densely pubescent, hair soft and a little curly, neither twisted nor matted; leaves pubescent on both surfaces, lanceolate, narrowly oblong or linear, up to 3 or 4 cm. long, usually with a pair of short, linear lobes from above the middle, entire, acute, narrowed to the base, sessile; inflorescences spikes up to almost half the length of the stem; terminal on the main stem and appressed branchlets; flowers dense when young, less so at maturity; bracts densely pubescent on both surfaces, linear or narrowly oblanceolate in outline, sessile, with usually 2 pairs of linear, acute lobes, the longer pair, from below the middle always developed, the shorter subapical pair sometimes wanting; flowers on very short, ca. 0.5–1.0 mm. pedicels; calyx 17–19 mm. long, densely long-lax-pubescent without, shorter pubescent within, tube cleft equally, or subequally medianly to below the middle, lateral cleavages 1.5–2.5 mm. long, the lobes subequal in size and shape, deltoid or ovate, acute; corolla 20–22 mm. long, lips exserted, lower lip ca. 6 mm. long, saccate, not indurate, pale yellow, lobes linear, acute, erect, galea 9–10 mm. long, carmine-red, densely stiff, golden, pubescent externally, margins inrolled, thickened; stamen pairs very unequal in length, the upper a little shorter than and included in the galea; style longer or shorter than the stamens, included, stigma lobes united, punctiform; capsule narrowly ovoid, 14–16 mm. long, subo-blique near the short-acuminate apex; seeds numerous, narrowly ovoid, the loose testa dark-reticulate.

Ancash: Cordillera Blanca, alt. 4,400 m., *Rauh-Hirsch P. 2096*.

This taxon is close to *Castilleja pseudopallescens* Edwin, differing in the lateral cleavage of the calyx, the calyx lobe size and shape, general pubescence, and in the lobing of the bracts.

Castilleja communis Benth. in DC., Prodr. 10: 529. 1846.

Erect, usually unbranched, rarely much branched, pilose-hispid annual or perennial herb. Leaves lanceolate or narrowly oblong-lanceolate, sometimes only up to 1–2 cm. long, usually 3–6(–7) cm. long, entire, narrowed to an acute apex and (usually) an acute base, sessile; bracts red-tipped, rarely purple-tipped, oblong, broader than the stem leaves, acute to subobtuse, entire, margins frequently a little thickened; flowers sessile, green or yellow-green; calyx exceeding the corolla, 14–18 mm. long, cleft about half-way, equally, anteriorly and posteriorly, secondary cleavages wanting, lobes oblong, obtuse, entire, sparsely glandular-pubescent, tube ventricose in fruit, narrowly cylindric in flower; corolla 12–16 mm. long, included in the calyx, the cylindric tube about equal to the length of the concave, externally pubescent, scarious margined galea, lip about 1.5–3.0 mm. long, the sac subobsolete, the lobes lanceolate, scarious, the median shorter than the 2 lateral; stamens about as long as the corolla, anthers linear; style about as long as the calyx, stigma 2-lobed; capsule broadly ovoid, oblique, drying black, glabrous, about as long as the corolla tube; seeds numerous, the loose fitting, reticulate testa narrowed to one end and much exceeding the seed body.

Apurimac: Prov. Abancay, 3,200 m., *Vargas 776*.—Cuzco: Valle de Santa Ana, 1,600 m., *Herrera 3614*; Macchu-picchu, alt. 8,750 m., Saunders *432*; alt. 4,000 m., *Soukup 276*; alt. 8,000 ft., *Stafford 789*; Prov. Quispicanchis, Marcapata, humid places, alt. 3,000 m., *Vargas 9676*; Prov. Paucartambo, between Achivani and Medias-Mayu, alt. 2,500–2,800 m., *Vargas 11123*.—Huanuco: Tingo María, *Soukup 2267*; Prov. Huanuco, in open sun along road, alt. 1,300 m., *Stork & Horton 9596*; Pillar, plant purple except base of flowers and leaves, alt. 2,700 m., *Woytkowski 34134*; Divisoria, in wet situation, alt. 1,600 m., *Woytkowski 34501*.—Junin: along road in sun, Chanchamayo Valley, alt. ca. 2,000 m., *Hutchison 1177*; alt. 1,200 m., *C. Schunke 406* and *582*; 1,500 m. *C. Schunke 1544*; Prov. Tarma: Utcuyacu, upon waste land, alt. 1,900 m., *Woytkowski 35413*.—Lima: Valley of Lima, *Dombey 6*; *Mathews 398*; Prov. Lima, 6 km. west of Pachacamoc, alt. 500 ft., *Saunders 197*; San Bartolo, 8 km. inland from San Bartolo, alt. 600 ft., *Saunders 198*.—San Martin:

Zepelacio near Moyobamba, alt. 1,200–1,600 m., *Klug 3486*; San Roque alt. 350–1,500 m., *Ll. Williams 6926* and *7154*.

The altitudinal range of this species is 350–4,000 m. and is much greater than that usually encountered in this family.

Common from Mexico to Chile in dry and wet open sites.

Castilleja fissifolia L. f., Suppl. 293. 1781, non Sesse et Mocino 1894. *C. coronopifolia* Vent., Choix. 59. 1803. *C. fissifolia* gamma *longifolia* Benth. in DC., Prodr. 10: 534. 1846. *C. stricta* Benth., l.c. 534.

Pubescent or puberulent, rarely subglabrous, often scabrous, erect annual or perennial. Leaves deeply cut into 3–7 linear lobes (rarely entire), usually from the upper half of the sessile, oblong, lanceolate or linear blade, body of the blade up to 4.5 cm. long and not exceeding 1 mm. wide and as the lobes entire, narrowed to a long-acute apex and sometimes narrowed to base, main veins (3–5) parallel and elevated beneath; flowers pedicellate, pedicels increasing with age, in fruit reaching 1.5–2.0 cm. long; subtending bracts pubescent on both surfaces, usually broader than the leaves, mostly with two pairs of linear lobes, one pair near the apex, the other below the middle of the blade, lobes acute and with the acute body red- or purple-tipped; calyx tubular, 17–22 mm. long, densely pubescent on both surfaces, medianly cleft more deeply anteriorly than posteriorly, laterally cleft almost a quarter to a half as deeply as medianly, lobes linear or lanceolate, obtuse, shorter than the tube, corolla 19–27 mm. long, lips exserted, shorter than the narrow tube, lower lip inflated, the pouch longer than the lanceolate lobes, galea less than to about 2 times the length of the lip, very densely beset externally with stiff, white pubescence; stamens included, the pairs very unequal in length, anthers linear; style and stigma included, about equal to the longer stamens in length, stigma lobes appearing united, separating under pressure; capsule ovoid, enclosed by the inflated calyx tube, glabrous, acute, up to 16 mm. long, septum persistent; seeds numerous, the loose testa reticulate, exceeding the seed body much more apically and basally than laterally.

Ancash: Cordillera Blanca, Québrada Cruz Piura, alt. 4,600 m., *Rauh–Hirsch P. 2090*.—Cajamarca: Celendin, *Osgood & Anderson 90*.—Cuzco: colinas del Laxaihuamán, alt. 3,500–3,700 m., *Herrera 832*; without data, *Herrera 3182*; Valle del Urubamba, alt. 2,800 m., *Herrera 3437*; Prov. Cuzco, alt. 3,500 m., *Vargas 254*.—Huancavelica: Prov. Huancavelica, 1 km. north of city of Huancavelica, alt.

3,700 m., *Stork & Horton 10918*.—Lima: Río Blanco, open hillside, alt. 3,000–3,500 m., *Killip & Smith 21606*.

Also collected in Colombia, Venezuela, Ecuador, and Bolivia.

Castilleja pseudopallescens Edwin, Phytologia 19: 404. 1970.

Erect herb up to 22 cm. tall, branches puberulent-pubescent, foliage puberulent-ciliate, stem alternate branching from near the base, drying yellow- to purple-brown, subshining, internodes 2–3 cm. long, at least on lower half of the stem; leaves lanceolate, narrowly oblong or linear, usually with 1 pair or 2 pairs of long or short, linear lobes, from minute to about 3 cm. long, most often 1.0–2.5 cm. long, lobes and blades acute, blades sessile, sometimes clasping; inflorescences lax or dense spikes; bracts a little wider than the leaves, with 2 or more often 3 pairs of linear lobes, the pair nearest the base longest, the pair at the apex shortest; flowers sessile, red-tinged; calyx 18–21 mm. long, cleft subequally medianly, tube puberulent or subglabrous, veins and lobe margins ciliate-ciliolate, lobes lanceolate, acute, laterally cleft 3–5 mm.; corolla well exserted, 25–28 mm. long, lip ca. 6 mm. long, little more than half as long as the galea, a little saccate, the 3 lobes linear or narrowly lanceolate, obtuse, galea dorsally pubescent, red or purple, 10–11 mm. long; stamen pairs only little unequal in length, the longer 2–3 mm. shorter than the galea; stigma lobes wholly united, capitate-punctiform, reaching the longer pair of stamens; young capsules narrowly ovoid, ca. 15, mm. long and 6–7 mm. wide, oblique near the acuminate apex; seeds linear to narrowly ovoid, the loose testa darkly reticulate.

Apurimac: Prov. Grau, cuestra Quellipata, stony slopes, alt. 2,700 m., March 9, 1946, *Vargas 5800*.

This taxon is related to the species of the section *Pallescentes* of western North America and may be placed therein.

Castilleja pumila (Benth.) Wedd., Chl. And. Nov. 2: 119. 1860. *C. nubigena* var. *pumila* Benth. in DC., Prodr.: 10. 543. 1846. *C. fissifolia* var. *pumila* (Benth.) Wedd., Chl. And. Nov. 2: 119. 1860.

Caespitose or subcaespitose, sometimes minute, perennial herb, with usually puberulent stem and foliage, one or both of which may be glabrous or rarely densely pubescent. Leaves sessile, sometimes less than 1.0 cm. long, rarely up to 3.5 cm., narrow, rarely exceeding 0.8 cm. wide, usually only up to 4–5 mm., linear to lanceolate, with or without 1 or 2 pairs of linear lobes, body and lobes entire, acute, base of the blade obtuse, 3–5 main veins elevated beneath; inflores-

cences short spikes, or the sessile or subsessile flowers axillary and solitary on the dwarfed plants; bracts wider than the leaves, most often with 2 pairs of lanceolate or linear, red-tipped, acute lobes; calyx 13–17 mm. long, often red-tinged, tube cylindric, cleft medianly subequally anteriorly and posteriorly, less than half way, the lateral cleavages minute or occasionally lacking, the lobes narrowly oblong, blunt or rounded; corolla 15–20 (–22) mm. long, tube cylindric-funnelform, lips exserted from the calyx, shorter than the tube, galea yellow-green to crimson, only sparsely puberulent externally, acute, margin entire, scarious, lower lip less than a third the length of the galea, weakly saccate, the lobe-tips acuminate; stamens included, didynamous, the pairs very unequal, anthers linear; style and stigma included, equaling or a little shorter than the longer filaments; stigma lobes wholly united, globose-capitate; capsule ovoid, about as long as the enclosing perianth tube, shining black; seeds numerous, ovoid in outline, trigonous in cross-section, the testa loose, reticulate, exceeding the seed body much more laterally than apically and basally.

Apurimac: Prov. Andahuaylas, Québrada in cold grassy slough, alt. 2,890 m., *Stork & Horton 10760*.—Cuzco: Colinas de Laxaihuamán, alt. 3,500 m., *Herrera 832*; La Raya, alt. 4,300–4,500 m., *Pennell 13500*; Cuzco, alt. 3,500 m.; *Pennell 13701*; Cerro de Colquipata, alt. 3,900–4,000 m., *Pennell 13742*; Macchu-picchu, alt. 4,000 m., *Soukup 300*; Prov. Canas, in grassland, alt. 3,800–4,500 m., *Vargas 9849*; Prov. Quispicanchis, puna vegetation, alt. 3,700 m., *Vargas 9714*.—Junin: Tarma–Aroya, alt. 4,200 m., *Rauh–Hirsch P. 267*; Prov. Huancayo, in puna grass, alt. 4,400 m., *Stork 10942* and *10943*.—La Libertad: Prov. Santiago de Chuco, alt. 3,500 m., *Stork & Horton 9994*.—Lima: near Morococha, moist meadow, alt. 4,350–4,800 m., *V. Grant 7563*; near Anticocha, Cerro Colorado, east of Canta, alt. 3,800–4,100 m., *Pennell 14658*.—Puno: Araranca, alt. 4,100–4,200 m., *Pennell 13428*; *Soukup 938*; Lake Titicaca, alt. 4,000 m., *Rauh–Hirsch M 47*.—Sin. Depto.: Viso, wet, rocky, brook banks, ca. 9,000 ft., *Macbride & Featherstone 603*; Yauli, "springy" slope, ca. 13,500 ft., *Macbride & Featherstone 920*; San Gaban, N. of Camjata Hacienda, Capachica Peninsula, 12,600 ft. *Tutin 1035*.

Also found in Ecuador. Occurring at elevations above 2,500 m., throughout its range, this species is easily separable from *C. fissifolia* in which it is frequently placed as a variety.

Castilleja virgata Dombey ex Wedd., Chl. And. Nov. 2: 119. 1816. *C. fissifolia* subvar. *virgata* Wedd., l.c. 119.

Erect perennial herb often forming clumps, unbranched or variously branching. Stem sparsely puberulent or glabrous, sometimes subdensely puberulent in the inflorescence; leaves entire or variably divided, lowermost usually entire, middle with 1 pair or less often 2 pairs of lanceolate or linear, minute or well-developed lobes, upper leaves with 2 pairs of lobes, narrowly lanceolate or linear, minute to 3.5 cm. long, usually less than 2.5 cm. long, blade body and divisions entire, acute, usually narrowed to base, sessile, puberulent on main veins on both surfaces; inflorescences spicate-racemose, dense or lax; bracts longer and wider than the upper stem leaves and with 2 pairs of red- or crimson-tipped lobes; flowers on glabrous or puberulent 6–8 mm. long pedicels; calyx tubular, bright green, 27–30 mm. long, usually puberulent on the veins and at the base externally, on tissue on the lobes internally, cleft medianly about a third the length posteriorly and two-thirds anteriorly, the lobes laterally retuse or emarginate, obtusely rounded; corolla yellow-green, very little to clearly exceeding the calyx, 28–34 mm. long, lip usually included, glabrous, saccate, the lobes indurate, linear, about 2–3 mm. long, galea usually somewhat nodding, most often at least partly exserted through the anterior median cleavage, densely golden-puberulent exteriorly, 16–18 (–19) mm. long, margin thickened, hardened, infolded, drying black; stamens didynamous, the pairs a little unequal in length, the longer a little shorter than to equaling the galea, included, anthers linear; stigma and style equal to or little longer than the galea, stigma included or exserted, punctiform to subclavate; capsule 15–17 mm. long, narrowly ovoid, glabrous, drying black, oblique near the short-acuminate apex; seeds numerous, ovoid, testa loose, reticulate.

Huanuco: Prov. Huanuco, Grassland, alt. about 12,000 ft., *Macbride & Featherstone 2190.*—Junin Mito, Grass-shrub slope, alt. about 9,000 ft., *Macbride & Featherstone 1668.*—Lima: near Antaicocha, Cerro Colorado, east of Canta, rocky wall of canyon, alt. 3,600–3,800 m., *Pennell 14643.*

Castilleja virgatoides Edwin, Phytologia 19: 405. 1970.

Erect, clumping, perennial herb up to 25 cm. tall. Stems pubescent in the inflorescences and either puberulent below or becoming glabrate near the base or entirely glabrous and shining brown; leaves linear or lanceolate, pubescent or puberulent on one or both sides, up to 3 cm. long, usually with 2 or 3 leaflets in the axil, entire, usually

with a pair of short, linear lobes, narrowed to an acute apex, sessile; inflorescence a spike or spicate in flower, racemose in fruit, often interrupted below; bracts with 1 or 2 pairs of lobes, little wider than the leaves, distally red (in vivo); flowers on short, ca. 1–2 mm. long, pubescent pedicels; calyx tubular, 15–17 mm. long, pubescent on both surfaces, obtusely rounded apically, medianly cleft very unequally, posteriorly only 2–3 mm., anteriorly beyond the middle, ca. 10–12 mm., lateral cleavages lacking; corolla about 20–24 mm. long, galea yellow-green (in vivo), about 10–11 mm. long, exserted, pubescent externally; lip rudimentary, ca. 1.5–2.5 mm. long, little if at all inflated, the lobes linear, the median shorter than the lateral; stamens included, pairs only a little unequal in length, anthers linear; stigma and style reaching to about the longer stamens, stigma lobes united, clavate; capsule drying black, glabrous, oblique near the short-apiculate apex, borne on pedicels up to 8 mm. long, placenta medianly thickened, septum early deciduous; seeds numerous, ovoid, the reticulate testa loose.

Cuzco: Prov. Cuzco, open rocky hill on trail to Pisac, alt. 3,500–3,600 m., April 28–30, 1925, *Pennell 13699*.—Apurimac: Salcantay, alt. 4,300 m., *Rauh-Hirsch P 1398*.—Ayacucho: La Quinau, grassy banks, alt. 12,000 ft., *Macbride & Featherstone 2002*.—Cuzco: Cordillera Veronica, alt. 3,300–3,500 m., *Rauh-Hirsch P964*.—Huancayo: Huaytapallana, alt. 4,600 m., *Rauh-Hirsch P1718*.—Junin: Mount La Juntay, near Huancayo, alt. about 4,700 m., *Killip & Smith 22085*.—Lima: Canta, mountains above Canta, *Pennell 14429*; East of Canta, alt. 4,000–4,200 m., *Pennell 14686*.—Sin. Depto.: Viso, shrubby slope, alt. ca. 9,000 ft., *Macbride & Featherstone 581*; Sin. Loc.: *Diehl 2563*.

This species is closely related to *C. virgata* Dombey ex Wedd. (see above) from which it differs in having smaller flowers and fruit, shorter stigma and style in relation to the stamens and galea, and in the shorter calyx in relation to the corolla. Further, the calyx lobes of *C. virgata* are laterally secondarily retuse and the (lower) lip of the corolla is clearly saccate. Both *C. virgata* and *virgatoides* are closely allied to species of the western United States that are now placed in the section *Linariaefoliae*. However, the Peruvian taxa differ sufficiently to warrant separate sectional status.

CONOBEA Aubl.

Erect or repent annual herbs, glabrous except the corolla tube internally, usually branched. Leaves usually petiolate, the petioles

decreasing toward the apex, uppermost leaves sometimes sessile, toothed or irregularly weakly cut; flowers solitary or 2–3-clustered, axillary, pedicellate; pedicels bibracteolate at apex; calyx of 5, imbricate sepals, free or united at the base, all alike or almost so and shorter than the corolla tube; corolla bilabiate, lips subequal, lobes shorter than or equaling the tube, patent, throat open, the 3 lobes of the anterior lip at least partly free, the two posterior lobes sometimes wholly united, corolla tube pubescent within anteriorly or sometimes both anteriorly and posteriorly; stamens 4, didynamous, included, filaments filiform, anthers dorsifixed, locules proximate, parallel; style deflexed at apex, stigma lobes 2, distinct; capsule loculicidal, globose. One (of seven) species, *Conobea scoparioides* (C. & S.) Benth., known from Peru. The genus is widely distributed in the Western Hemisphere from Illinois to Florida, Mexico to Panama and from Brazil to Venezuela and west to Peru. Two collections seen from Trinidad. However, no species is commonly found in great concentration in any small area.[1] The greatest concentration of the taxa in the genus is Eastern lowland South America.

Conobea scoparioides (C. & S.) Benth. in DC., Prodr. 10: 391. 1846. *Sphaerotheca scoparioides* C. and S., in Linnaea 2: 606. 1827.

Stems and branches 4-angled, the angles ridged, interangular tissue striatulate. Leaves elliptic, lance-elliptic and less often subovate-elliptic, up to about 6 cm. long and 1.5 cm. wide, usually smaller, decreasing apically, densely punctate with deeply impressed punctations, margins serrate-serrulate especially on the upper half, acute to long-acute at apex, attenuate to the base that narrowly wings the petiole; pedicels erect to spreading, up to 2.4 cm. long, usually about 0.8–1.5 cm. long, filiform, rarely less than 3 times longer than the calyx, often 4 or more times longer, bibracteolate at apex; bracteoles minute, frequently appressed to the calyx, sessile and widest at the base; sepals imbricate, narrowly lance-ovate, margins frequently scarious, sometimes also minutely ciliolate, up to 3.5 mm. long, usually 2.5 to 3.0 mm., usually wholly free, sometimes united only at the base; corolla about 7–9 mm. long, blue and lavender, bilabiate, the tube subcylindric, longer than the lobes (occasionally the lobes equal to the tube), exserted, internally beset with short, sometimes clavate hairs posteriorly or both posteriorly and anteriorly, the hairs usually restricted to just below the open throat or continuing to the tube base; stamens 4, didynamous, glabrous, the filaments inserted

[1] *Conobea multifida* (Michx.) Benth is found scattered in small patches throughout its range in the United States.

about halfway on the tube, the longer pair sometimes reflexed, the anthers almost coherent; ovary globose, shorter than the erect style, stigma-lobes free and usually spreading; capsule broadly ovoid to globose, about as long as the sepals; seed minute, testa longitudinally striate and reticulate, apiculate at both ends, light brown, numerous.

Loreto: Iquitos, 100 m. alt., *Killip & Smith 27031*; *Klug 1231*; On the Amazon River, Pegas, *Ll. Williams 1713* and Caballo-Cocha, *Ll. Williams 2432*. Also in Brazil and Colombia.

It is to be expected that further collecting in lowland Peru will uncover *C. aquatica* Aubl., closely allied to our species and up to now found in Trinidad, the Guianas, Venezuela, and Brazil.

DIGITALIS L.

Densely golden pubescent herb, erect, simple or branched from the base. Stems lanate; leaves[1] ovate, cauline mostly alternate, up to 15 cm. long and 8–10 cm. wide, coarsely crenate-dentate, usually pubescent on both surfaces, the largest leaves radicle, clustered below, decreasing abruptly in size upward, bases of the larger long-acute, often thinly winging the long petioles, upper petioles very short, uppermost leaves sessile, apices long-acute to obtuse; flowers in long racemes, pedicellate; pedicels thickened, densely lanate, lower up to 2 cm. long, decreasing apically; calyx lobes ovate or oblong, acute, long-acute or acuminate, pubescent on both surfaces; corolla up to 5 cm. long, purple, throat darker purple-dotted, the dots surrounded by paler tissue, bilabiate, the 3-lobed anterior lip (the lower) little longer than the 2-lobed posterior median lobe of anterior lip longer than the lateral lobes, tube anteriorly ventricose, much longer than the lobes, glabrous without, pubescent or glabrous within; anthers included, didynamous, filaments flattened; style much longer than the ovary, stigma lobes distinct, ligulate, ovary lax-pubescent; capsule ovate (ex desc.), septicidal, secondarily weakly loculicidal; placenta thickened, septum semi-persistent; seed numerous, minute, oblong-subglobose, testa rugose.

An old world genus of about 30 species, especially abundant in Europe and Asia.

A single species in Peru.....*D. purpurea.*

[1] The one collection seen from Peru bears only young leaves. This part of the description based on extra Peruvian specimens.

Digitalis purpurea L., Sp. Pl. 621. 1753.

Calyx lobes 5, united only near the base, about 12 mm. long and 7 mm. wide, a little unequal in length and width; anther locules subparallel to divergent, contiguous at apices, ovoid, dehiscing by a single slit through the septum; style ca. 20–25 mm. long, ovary narrowly ovoid, ca. 8–11 mm. long; capsule little longer than wide, glandular-hirsute.

Cuzco: Prov. Quispicanchis, along the road at alt. 2,700 m., *C. Vargas C. 1328.*

Probably an escape from cultivation. Naturalized in Canada and the United States as well as in mountain meadows of Costa Rica. The taxon is well established in Colombia and becoming so in Chile.

The species has long been of importance in medicine, yielding several powerful drugs.

ESCOBEDIA R. & P.

Escobedia R. & P., Prodr. Fl. Peruv. 91, *t. 18.* 1794, generic description only; Syst. Veg. Fl. Peruv. 159. 1795, genotype *E. scabrifolia* R. & P.; *Salvia* Vell., Fl. Flumin. 1: 55, *t. 149.* 1825. *Nicalia* Raf., Fl. Tellur. 2: 104. 1837.

Ref.: Pennell Proc., Acad. Nat. Sci. Phila. 83: 411–426. 1931.[1]

Perennial herb dying back to the roots, erect, simple or branched, puberulent or glabrous. Cauline leaves sessile, opposite; flowers forming racemes, in the axils of leaf-like bracts; pedicels bibracteolate, rarely ebracteolate; calyx tubular or funnellform, lobes shorter than the costate tube; corolla salverform, white, fragrant, tube externally glandular-puberulent, rarely glabrous, internally pilose, lobes united, internally pilose; genitalia about reaching the corolla throat; stamens 4, equal, filaments ciliate, anthers narrow, glabrous, locules equal, base aristate; style elongate, with two stigmatic lines at apex; capsule ellipsoid, woody, glabrous, ultimately exposed by the breaking of the calyx tube; seeds numerous, linear.

A neotropical genus with two easily separable subgenera occurring from Mexico to Chile and Argentina. The extremely showy, large white corollas simulate *Nicotiana* spp. of the *Solanaceae.* The

[1] The generic and specific descriptions and the key for *Escobedia* are essentially those appearing in this reference. Only two sheets of *E. scabrifolia* R. & P. were available to the writer; no other Peruvian material seen.

genera are sympatric and apparently compete for the same pollinators. At present comprising 15 species but conceivably many more will be described as collecting progresses. Three species occur in Peru.

1. Peduncles less than 2.0 cm. long; largest leaves 10–16 cm. long. *E. brevipes.*
1. Peduncles 2 cm. or more long (2–5 cm.); largest leaves 6–8 cm. long.
   2. Bracteoles on the upper part of the peduncles, 14–20 mm. long; peduncles 3–5 cm. long. . . . . *E. foliolosa.*
   2. Bracteoles on about the middle of the peduncles, 2–8 mm. long; peduncles 2–3 cm. long. . . . . *E. scabrifolia.*

Escobedia brevipes Pennell, Proc. Acad. Nat. Sci. Phila. 83: 418. 1931.

Stem simple or branching near the top, puberulent or glabrous. Leaves oblong or ovate-oblong, acute or acuminate, serrate or more or less entire, scabrellus especially above, often glabrate below, the largest 10–16 cm. long and 4–5 cm. wide; pedicels 1.5–2.0 cm. long; bracteoles 5–12 mm. long, linear or elliptic-lanceolate, inserted on the upper half of the peduncle; calyx tube 4 cm. long, teeth 4–6 mm. long, calyx tissue glabrous or scabrellus with 5 scabrous-puberulent veins; corolla tube 8–9 cm. long, externally glandular-puberulent, lobes 5–7 cm. wide, internally pilose; capsule unknown.

Huanuco: Chinchao, *Ruiz & Pavon s.n.*—San Martin: Tarapoto, *Spruce 4456.*

Known also from Bolivia: Beni, Chuquisaca, and La Paz.

Escobedia foliosa Pennell, Proc. Acad. Nat. Sci. Phila. 83: 419. 1931.

Stem up to about 5–7 cm. tall, simple, puberulent, and angled. Leaves oblong-lanceolate, acute, serrulate or entire, above scabrellus or glabrate, beneath paler with puberulent veins, the largest 6–8 cm. long and 3–4 cm. wide; pedicels 3–5 cm. long; bracteoles 14–20 mm. long, lanceolate or elliptical-ovate, inserted 3–10 mm. below the calyx; calyx tube 3–5 cm. long, teeth 5–6 mm. long, triangular, acuminate, calyx glabrous with 5 prominent, puberulent or glabrous veins; corolla tube 7–10 cm. long, externally glandular-puberulent or glabrous, lobes 6–8 cm. wide, internally pilose; capsule not seen.

Chachapoyas: Sesuya, *Mathews s.n.*

Collected in Ecuador (Tungurhua), as well as northern Peru.

Escobedia scabrifolia R. & P., Syst. Veg. Fl. Peruv. 159. 1798.

Stems simple or branching on the lower half, 5–6 cm. tall, almost round, puberulent or glabrous. Leaves oblong-lanceolate or ovate, obtuse or acute or acuminate, serrulate or entire, scabrous above and with large, prominent, distant, puberulent veins beneath, largest 6–8 cm. long and 1.5–3.5 cm. wide; pedicels 2–3 cm. long; bracteoles 2–8 mm. long, linear, medianly placed on the pedicel; calyx tube 3.0–3.5 cm. long, teeth 5–8 mm. long, triangular, acute or acuminate, glabrous, beset with 10 veins, 5 larger with 5 smaller medianly between, puberulent; corolla tube 8–11 cm. long, lobes 5–6 cm. wide, internally pilose; capsule 2 cm. long, seeds 4.0–4.5 mm. long.

Huanuco: Muña, *Macbride 3934*.—San Martín, Cerro de Campaña, *Spruce s.n.*

On the eastern slope of the Andes in central Peru and at higher elevation than *E. brevipes*.

EUPHRASIA L.

Annual branched herbs, a few cm. tall. Leaves opposite, subsessile to sessile; flowers in terminal, spike-like inflorescences, ebracteolate, small; calyx of 4, united sepals, cleft more deeply medianly than laterally, teeth shorter than the tube; corolla tube exserted, narrowly cylindric, a little shorter than the lips; upper lip galeate, reflexed-margined, longer and narrower than the 3-lobed, reflexed lower lip; stamens 4, included in the galea, anther cells dorsifixed, parallel, basally short-awned, confluent at apex; style little longer than the anthers and exceeding the galea, ovary much shorter than the style; capsule obovoid, loculicidal, little longer than wide, strongly compressed, seeds few, longitudinally sulcate.

A genus comprising about 90 species mostly cold-temperate to subarctic in both the northern and southern hemispheres and in the new and old worlds.

Only one species thus far verified as to its occurrence in Peru, *E. pubescens*.[1]

[1] In Anales del Instituto Botanico A. J. Cavanilles (Anales del Jardin Botanico de Madrid) 1 (17): 452–458. 1959, seven species considered to be *Euphrasia*, six of which are said to have been collected in Peru, are presented. Of these, possibly two, *E. incana* R. & P. and *E. dentata* R. & P., may be *Euphrasias*. The remaining taxa are species of *Bartsia* or not generically clear to me. Nor can distinctions between *E. dentata* and *incana* as well as *pubescens* be determined now.

Euphrasia pubescens Benth. in DC., Prodr. 10: 555. 1846.

Stem and foliage densely soft-pubescent. Cauline leaves up to 3 mm. long, deeply cut into 3, almost free lobes, joined only at the base, lobes linear to narrowly oblong-lanceolate, entire, apices acute; flowers subtended by bract-like leaves or occasionally these modified with the median lobe much exceeding the lateral; calyx ca. 5–6 mm. long, tube little inflated, subcylindric, teeth subequal, acute, posterior median cleavage little deeper than anterior cleavage; corolla 11–13 mm. long, tube well exserted about equaling the lobes, posterior lip (2-lobed galea) longer and narrower than the 3-lobed laciniate, deflexed anterior lip.[1]

Sin. Loc.: *Dombey s.n.*, ex photograph Paris Herbarium.

GALVESIA Dombey ex Juss.

Galvesia Domb. ex Juss., Gen. Pl. 119. 1789, non R. & P., Fl. Peruv. Prodr., 56, 1794=*Pitavia* Molina (Rutaceae).

Branched shrubs or large herbs, new wood sparsely puberulent so glandular-pubescent or -puberulent, occasionally glabrous, older wood frequently glabrate. Leaves opposite or ternate-verticillate, upper sometimes subopposite, rarely uppermost alternate, ovate to lance-ovate, mostly 1–4 (–5) cm. long, sometimes longer or shorter and usually less than half as wide, but varying to three-fourths as wide, glabrate to glandular-pubescent, entire, apices subobtuse to more often acute, sometimes short-acuminate, bases acute, subobtuse or obtuse; petioles 2–10 cm. long, usually glandular-pubescent; flowers pedicellate or forming short racemes, mostly crowded near the tips of the branches, solitary in the axils of usually reduced leaves; pedicels glandular-puberulent to glabrous, 5–25 mm. long; calyces with vesture as the pedicels, when glandular-puberulent often both internally and externally, 3.0–4.5 mm. long, lobes subequal, lance-ovate or lanceolate; corolla red, 14–23 mm. long, bilabiate, lips subequal, from a quarter to almost a half the length of the tube, upper lip (posterior) 2-lobed, reflexed, lower 3-lobed, median lobe little longer than lateral, tube gibbose at base, constricted immediately above gibbosity, then little ampliate to the obstructed throat, palate of the lower lip composed of 2 swellings and only partly closing the throat, usually glandular-puberulent; stamens 4, didynamous, included or exserted, upper, posterior pair shorter than the lower, anterior, locules parallel and lanceolate before dehiscence,

[1] Description drawn largely from a Dombey collection from Chile.

dehiscing longitudinally by slits, locules circular after dehiscence, contiguous, a fifth very reduced, ca. 2–3 mm. long, staminode usually present at the base of the corolla posteriorly, filaments of the fertile stamens pubescent (usually densely) below, glandular or glabrous above; ovary about a fourth the length of the style that is about equal to the posterior stamens, stigma lobes united or barely free at the tips; capsule depressed-globose, 4–7 mm. long, thin-walled, dehiscing by two irregular pores; seed numerous, reaching 1 mm. long, testa irregularly broken-ridged, placenta thickened, persistent.

Two closely allied species (as here interpreted) occur in Peru.

A genus of five to six species of the new world. Distributed from the southwestern United States to Colombia and Peru. No collections have been seen from the West Indies. The area of greatest concentration found in Mexico and secondarily in Peru.

Corolla 12–15 mm. long, the tube about 2–3 times longer than the lips; leaf-blades mostly less than 2 cm. long; petioles mostly less than 3.5 mm. long; pedicels mostly as long as or little longer than the subtending leaves; anthers usually included . . . . . *G. fruticosa.*

Corolla 18–23 mm. long, the tube up to 2 times longer than the lips; leaf-blades mostly 2 cm. long or longer; petioles usually 3.5 mm. long or longer; pedicels most often shorter than the subtending leaves; anthers frequently exserted . . . . . *G. ballii.*

Galvesia ballii Munz, Proc. Calif. Acad. Sci. ser. 4, 13(12): 379. 1926. *G. limensis* var. *grandiflora* Benth. in DC., Prodr. 10: 296 1846.[1]

A branched herb or shrub. Leaves usually acuminate or acute; petioles flattened, puberulent, little longer than in *G. fruticosa*; pedicels 5–10 (–12) mm. long; calyx lobes 3.5–4.5 mm. long, lance-ovate to lanceolate; fertile stamens often eglandular above, 12–14 mm. long, usually exserted; pistil 11–14 mm. long; capsule up to 7 mm. long. Otherwise as *G. fruticosa.* Endemic in Departamentos Piura and Tumbes of northwestern Peru and only with difficulty separable from *fruticosa.* Pennell, Not. Nat. 179. 5–6. 1946 considered the two taxa clearly specifically separable. Munz (l.c.) felt that perhaps they are only varieties of the same species. Although specific rank is here

[1] *G. grandiflora* (Kell.) Benth. an erroneous citation of Wettstein in Engler & Prantl, Pflanzenf. IV(3b): 61. 1891, based on Ball's use of *G. limensis* var. *grandiflora* Benth. in Journ. Linn. Soc. 22: 151. 1887, for a California species caused Munz to propose *G. ballii.* The presentation by Wettstein is "too garbled," fide Pennell.

maintained for the two taxa, varietal or even synonymic status could be considered equally correct.

Piura: Negritos, Parinas Valley, *Haught F-121*; Paita,[1] *André 4119* (cited by Munz); Abra, 1,350 m., *Hutchison 1393*; 0-20 m. alt., *Pennell 14810*; *Savatier s.n.*; Talara: about the cliffs, "clavela," *Johnston 3052*; Rocky localities in Québrada, 100 m., *Rauh–Hirsch P 11.*—Sin Depto.: *A. H. Olsson s.n.*—Tumbes: Prov. Tumbes, alt. 100 m., *Weberbauer 7752.*

Galvesia fruticosa Gmel., Syst. Nat. ed. 13, 2: 927. 1791. *Dodartia fragilis* R. & P., Syst. Veg. Fl. Peruv. 1: 97. 1798. *Russelia? alternifolia* Pers., Syn. 2: 164. 1807. *Agassizia limensis* Domb. ex Chav., Monogr. Antirrh. 180, *t. 11.* 1833. *Galvesia limensis* Domb. ex Benth. in DC., Prodr. 10: 296. 1846.

Much branched shrub, new wood sparsely puberulent to occasionally glandular-puberulent, vesture decreasing with age. Leaves broadly ovate to lance-ovate, usually opposite, uppermost subopposite or alternate, usually glandular-puberulent on both surfaces, more so beneath, occasionally with the wood and calyces essentially glabrous, from more than to less than twice as long as wide; petioles grooved above, usually glandular-puberulent; pedicels glandular-puberulent, slender, little recurved, mostly 8–20 mm. long; calyx lobes 5, sepals united about a third their length, mostly glandular-puberulent on both sides, lance-ovate 2–3 mm. long; corolla tube glandular-pubescent on both surfaces and the palate; fertile stamens 8–9 mm. long, filaments densely pubescent on lower third and usually glandular above, inserted at base of the corolla tube, fifth stamen bearing sterile anthers on a 1–2 mm. long, filiform filament; style almost equaling the stamens, about 4 times longer than the ovoid or subglobose ovary; capsule 4–5 mm. long.

Ancash: Río Fortalésa, alt. 2,000 m., *Rauh–Hirsch P1956*; Prov. Santa, 2–50 m. alt., Las Lomas hacia Huarney, *C. Vargas C. 1224.* —Ica: Prov. Ica, Pampa de Huayuri, 382 km. S. of Lima on Pan American Highway, alt. 550 m., *Hutchison 1223*; Prov. Pisco, Pisco Tal, alt. 7,000 m. (?), *Rauh–Hirsch P402.*—Lima: *Dombey s.n.*, Isotype[2]; Canta Valley, alt. 350 m., *Hutchison 1001*; Río Chillon, near

[1] Alternate spelling, Payta.

[2] Manuscript citing this collection in Dombey's protologue, mss. Fl. Peruv., in Paris. Seen by Jussieu.

Viscas, alt. 1,800–2,000 m., *Pennell 14316*; bank of Río Rimac, W. of Lima, alt. 10–30 m., *Pennell 14288*.—Sin. Dept.: Hacienda Huando, alt. 400 m., *Saunders 189*; Olmos–Jaen,[1] alt. 800 m., *Rauh–Hirsch P 2135*; Río de Pariocota, alt. ca. 3,000 ft., *Macbride & Featherstone 2540*; Río de Lomas, *Weberbauer 5742*.

The wide altitudinal range of these collections may explain in part at least, the variability of this taxon. Collections confined to coastal and Andean Peru. The 7,000 m. collection of *Rauh–Hirsch* is erroneous as to altitude. There are no mountains of this height in the area.

GERARDIA Benth.

Gerardia Benth. in DC., Prodr. 10: 514. 1846. *Gerardia* L., Sp. Pl. 610. 1753 as to *G. purpurea* only; not as the generic description in L., Gen. Pl. ed. 5. 266. 1754, nor as to derivation.[2] *Virgularia* R. & P., Prodr. Fl. Peruv. 92, *t. 19*. 1794. *Chytra Gaert.*, Fr. et Sem. 3: 184, *t. 214*. 1805. *Agalina* Raf. New Fl. Amer. 2: 61. 1837.

Herb or less often a shrub, erect and branched. Leaves opposite, entire, petiolate or sessile, linear to lanceolate; flowers axillary over most of the branches or terminally clustered in interrupted racemose or spicate inflorescences; pedicels longer or shorter than the calyx and the subtending bract-like leaves; calyx campanulate, the 5, almost wholly united lobes, valvate or narrowly imbricate and reduced to spine-like teeth; corolla pink to dark red to (most often) purple, tube usually campanulate to campanulate-subfunnelform, externally pubescent, longer than the flaring lobes, throat open; stamens 4, didynamous included, filaments pubescent, anther cells equal, usually appendaged at base; style elongate, stigmas united; capsule loculicidally dehiscent, secondarily barely septicidal at apex of the valves; seeds numerous, testa loose.

A temperate zone, new world genus with about 60 species.

One polymorphic species occurs in Peru, *G. lanceolata*.

Gerardia lanceolata (R. & P.) Benth. in Hook., Comp. Bot. Mag. 1: 207. 1835; DC., Prodr. 10: 516. 1846. *Virgularia lanceolata* & *V. revoluta* R. & P., Syst. Veg. Fl. Peruv. 161. 1798. *Gerardia an-*

[1] The Jaen–Olmos Road traverses the departments of Cajamarca, Lambayeque, and Piura.

[2] Derivation pertains to a genus in the Acanthaceae.

gustifolia, *G. lanceolata* and *G. parvifolia* Benth. in DC., Prodr. 10: 516. 1846. *G. bangii* O. Ktze., Rev. Gen. 3(2): 233. 1898. *G. megalantha* and *G. stenantha* Diels in Engl., Bot. Jahrb. 37: 429. 1906.

Stems and branches striatulate, usually very short-puberulent with the vesture in rows, occasionally glabrous. Leaves linear to lanceolate, usually glabrous and gland-dotted, up to 6–7 cm. long, usually much shorter, sometimes only 1–2 cm. long, longer or shorter than the nodes, acuminate, entire, upper leaves sessile, bracteolate lower short-petiolate, costa impressed beneath; petioles indurate, almost as wide as the base of the blade, usually glabrous; pedicels from 1–2 mm. to 2 cm. long or longer, glabrous to densely puberulent; calyx tube a little to much longer than the narrowly lanceolate to lanceolate, long-acute or -acuminate, tooth-like lobes, glabrous or puberulent as the pedicels, 5–9 mm. long, lobes usually puberulent on both sides, more densely internally, occasionally one or both sides glabrous; corolla pink to purple, often with darker markings and frequently darker within, externally densely villose, corolla tube 2–3 cm. long, about 4 times longer than the ovate lobes, throat sometimes villose within, lobes frequently puberulent within; stamens 4, didynamous, posterior pair longer, filaments puberulent, anthers narrowly oblong, mucronulate at base; style exserted, stigma lobes united; capsule usually a little longer than the calyx, globose; seeds shining, irregular in outline, angulate, brown to dark brown-black; septum deciduous, placenta thin. Common at varying altitudes throughout the Andes of southern and central Peru.

Apurimac: Prov. Abancay, Upper Marino Valley, alt. 3,000 m., *Stork, Horton & Vargas 10639*; alt. 2,600 m., *Weberbauer 5846*.—Chachapoyas: *Mathews 3137*.—Cuzco: Prov. Quispicanchis, Marcapata, alt. 3,600 m., *Vargas 1336*; *Weberbauer 7782*; Prov. Urubamba, Macchu-picchu, alt. 2,200 m., *Mexia 8080*; alt. 8,750 ft., *Saunders 435*; alt. 7,000 ft., *Stafford 793*; Cerro de Cusilluyoc, alt. 3,400–3,800 m., *Pennell 13806*; alt. 3,800–3,900 m., *Pennell 13827*; alt. 2,500–3,000 m., *Pennell 13933*; Ayusbamba, laderas, alt. 2,700 m. *Vargas 294*; Paucartambo, Laderas de Pillahuata, alt. 3,300 m., *Vargas 6*.—Huancavelica: Prov. Huancavelica, Mejorada, alt. 2,400 m., *Stork & Horton 10905*; Prov. Tajacaja, Surcubamba–Salcabamba Trail, alt. 2,300 m., *Stork & Horton 10414*; alt. 2,800–2,900 m., *Weberbauer 7613*.—Huanuco: Muña, alt. 7,000–9,000 ft., May 1863, *Pearce, s.n.*; alt. 2,700 m., *Woytkowski 48*.—Junin: Huacapistana, alt. 1,800–2,400 m., *Killip & Smith 24318*; Mito; alt. ca. 9,000 ft.,

Macbride & Featherstone 1457 p.p.; Prov. Huancayo, Torre-torre, alt. 3,317 m., *Soukup 2939*.—Pasco: Huariaca, alt. ca. 9,500 ft., *Macbride 3095*; Yanahuanca, alt. about 10,000 ft., *Macbride & Featherstone 1201*.—Puno: Near Puno, alt. 4,000 m., *Soukup 233; 393; 418*; Prov. Sandia, Environs of Limbani, alt. 3,500 m., *Vargas 9662*.—Sin. Dept.: Uspachaca, alt. about 8,500 ft., *Macbride & Featherstone 1306*; Río Marañon, alt. about 7,500 ft., *Macbride & Featherstone 1981*; Tabina, *Lechler 2084*; *Poeppig 1373*; *Pavon, s.n.*

HEBE Commers. ex Juss.

Evergreen trees or shrubs with opposite, coriaceous leaves that leave conspicuous scars upon falling. Inflorescences (in ours), axillary and lateral racemes; flowers dense and several ranked around the axis; calyx lobes forming a very short tube; corolla more than 2 times longer than the calyx, tube a little longer than the lobes; stamens exserted; ovary ovoid-ellipsoid, much shorter than the exserted style, stigma lobes punctiform; capsule compressed, septicidally dehiscent, the septum subsequently dehiscing medianly to release the seed, secondarily partly loculicidally dehiscent, ovoid-ellipsoid or subglobose, much exceeding the calyx; seed few, flattened, testa smooth.

A genus of about 150 species native to New Zealand. About three species disjunct in Chile, Argentina, and the Falkland Islands.

A single species, escaped from cultivation, known from Peru, *H. corriganii*.

Hebe corriganii Carse, T. N. Z. I. 60: 573. 1930.

Small tree (in ours), essentially glabrous, pedicels, calyces and leaf-margins excepted. Leaves lanceolate, 7.5–14.5 cm. long and 1.5–2.5 cm. wide, margin entire, minutely pubescent, subhyaline, narrowed to both ends, the winged petiole 1–3 mm. long; inflorescences lateral racemes, most often exceeding the subtending leaves in length, flowers densely situated on 2–3 mm. long, puberulent pedicels, each subtended by a minute bracteole; calyx about 3 mm. long, lobes 2.0–2.5 mm. long, lanceolate, acute, ciliolate on the pale, membranaceous margin; corolla white, tube cylindric, about 4–5 mm. long, lobes equal, narrowly ovate, 3–4 mm. long, entire; filaments about 7.5–9.0 mm. long, anthers parallel or almost so; pistil only little shorter than the stamens, style apex and stigma exserted; capsule about 4–5 mm. long and 3–4 mm. wide, walls indurate, brown, smooth, glabrous; septum thickened, persistent, placenta thin.

Cuzco: Granja, Yucay, small tree, *Soukup 565*.

LAMOUROUXIA HBK[1]

Erect, usually pubescent, perennial herbs or subshrubs with opposite leaves and red or reddish corollas. Leaves narrow, sessile or short-petiolate, usually deeply toothed, or lobed, the teeth and lobes sharp; flowers in spike-like inflorescences; pedicels very short or lacking; calyx of 4, united sepals, tube campanulate, teeth acute, equal in pairs, the median cleavages longer than the lateral; corolla bilabiate, tube elongate, swollen then compressed, posterior lip galeate, of 2, united petals, entire or emarginate, wider and a little shorter or longer than the 3-lobed anterior lip, the latter 2-plicate or 2-ridged and the lobes short; stamens 4, didynamous, included in the galea, posterior shorter than anterior, anthers bearded, usually mucronate or short-awned basally, coherent in pairs, locules distinct, parallel, equal; style entire, stigmatic at apex, obtuse; capsule ovoid, loculicidal; seeds many, smooth or striate-sulcate, with or without reticulate, hyaline wings.

A tropical American genus of about 30 species, one of which has been collected in Peru, *L. breviflora*.

Lamourouxia breviflora Benth. in DC., Prodr. 10: 540. 1846. *L. subincisa* Benth., l.c.

Erect perennial herb or sometimes shrubby at base or a subshrub, profusely branching on upper part of stems. Stems more or less densely pubescent; leaves lanceolate or narrowly oblong, up to 4 cm. long and 0.8 cm. wide, usually smaller, subsessile or sessile, often attenuate to base, irregularly, distantly or closely, coarsely sharp-toothed or -lobed, most often pubescent beneath, occasionally on both surfaces, rarely glabrous, veins conspicuously elevated beneath, obsolete above; inflorescences spikes or spike-like; flowers sessile or on sparsely pubescent, 0.5–2.5 mm. long pedicels that are thickened, especially at base; bracts leaf-like, bracteoles lacking; calyx about half the length of the corolla or shorter, calyx tube shorter than the lobes, campanulate or broadly campanulate, subglabrous (rarely) to densely soft-pubescent; calyx teeth pubescent, lanceolate, acute, margins entire or distantly, irregularly serrulate; corolla up to 20 mm. long, usually 10–16 mm., externally more or less densely pubescent or puberulent, internally pubescent in the flaring, elongate, often

[1]Nominum Conservandum Proposita, fide L. O. Williams, Nov. 1967.

plicate throat and along one or more of the lines of petal connation, lobes ovate, entire, anterior little spreading; anthers short-awned basally; capsule about equaling to little longer than the calyx, narrowed and acute apically, septum papery, soon deciduous.

Amazonas: Prov. Chachapoyas, W. of Chachapoyas, alt. 2,400 m., *Pennell 15493*.—Ancash: Monterrey, 3 km. below Huaraz, alt. 3,000–3,100 m., *Pennell 15307*.—Cajamarca: Prov. Cajamarca, "Santa Polonia" above Cajamarca, alt. 2,700–2,800 m., *Pennell & Ferreyra 14924*; Québrada de San Vicente, S.W. of Cajamarca, *Pennell & Reichlin 14991*.— Junin: Tarma, steep S.W. slope at alt. ca. 7,000 ft., *Macbride & Featherstone 1007*.—Pasco: Huariaca, shrubby canyon, about alt. 9,500 ft., *Macbride 3111*.—Sin. Depto.: Viso, alt. about 9,000 ft., *Macbride & Featherstone 582*.—Sin. Loc.: *Mathews 3138*.

This species is limited to the Andes of northern and central Peru.

Weberbauer 6025 is probably a new *Lamourouxia* but the material is insufficient for adequate description.

Lamourouxia sylvatica HBK. (Nov. Gen. et Sp. 2: 337. 1818) may be a *Bartsia*. One collection reported from Peru, not seen.

This genus has a checkered nomenclatural history. *Lamourouxia* Agardh, 1817, is not legitimate since it is based on identical material as *Claudia* Lamouroux, 1812. However, *Claudia* Opiz ex Panzer, 1808 in the synonymy of *Melica* L., 1753 must be considered. The conservation of *Lamourouxia* HBK. permits a simple solution to this tangle. Another generic appellation is available for the algal genus of Lamouroux and Agardh.

LEUCOCARPUS D. Don

Erect glabrous or puberulent herb, stem 4-angled, the angles usually with small wings. Leaves cordate-clasping, almost amplexicaul; flowers congested in axillary, simple or more often compound dichasia, or occasionally cymose, 3-flowered; basal peduncle 1 in each axil, pedicels from shorter to less often longer than the peduncle; flower-bearing stalks bracteolate; calyx of 5 united sepals, tubular-campanulate, membraneous, prominently 5-ribbed, lobes short-acuminate; corolla wholly yellow, tube elongate, throat widened, bilabiate, lips flattened, upper (posterior) 2-lobed, lower (anterior) 3-lobed, lobes rounded, plane; stamens 4, didynamous, included, anther locules distinct, divergent or divaricate; style thickened at apex, stigma 2-

lobed, interior margins stigmatic; fruit a globose, indehiscent or loculicidal berry; seed numerous, very small, testa reticulate.

A monotypic genus,[1] distributed from Mexico to Chile and Argentina, commonest in Central America. Not yet collected in the West Indies or the southern United States.

Leucocarpus perfoliatus (HBK.) Benth. in DC., Prodr. 10: 335. 1846. *Mimulus perfoliatus* HBK., Nov. Gen. et Sp. 2: 371. 1818. *Conobea alata* Graham, in Edinb. N. Phil. Journ. 3: 1830. *Leucocarpus alatus* (Graham) in D. Don. in Sweet, Brit. Fl. Gard. 2: *pl. 124*. 1831.

Much branched from the base, perennial. Leaves lanceolate or elliptic-lanceolate, up to 25 cm. long (occasionally longer) and 5–6 cm. wide, serrate, acute; peduncles mostly 1.5–3.0 cm. long; pedicels 0.8–2.5 cm. long, all flowering stalks bibracteolate near their bases, bracteoles decreasing in size to the ultimate pedicels; calyx oblique, 1.0–1.3 cm. long, tube much longer than the sharply acuminate, subequal, tooth-like lobes; corolla 1.2–1.5 (–1.8) cm. long, tube internally with 2 pubescent ridges anteriorly, bilabiate, the anterior lip longer; stamens inserted near the base of the corolla tube; ovary subglobose shorter than the style; berry exceeding the calyx tube, chalky white in life, brown when dry; seed dispersed in copious pulp. (The corolla is very similar to *Mimulus L.*, but the fruit and calyx differ sufficiently to justify the present arrangement.)

Piura: Prov. Huanacabamba, above Shumaya, alt. 2,200–2,300 m., *Weberbauer 6289*.—Huanuco: Several km. W. of Carpish, along stream, alt. 2,800 m., *Stork & Horton 9896*.—Junin: Latipo, alt. 500 m., *Soukup 2846*.

LIMOSELLA L.

Reference: Gluck H., Limosella—studien in Engler, Bot. Jahrb. 66: 488–566. 1954.

Herbs of brackish or saline mud, occasionally submerged or partly so, acaulescent or the stems repent or sometimes stoloniferous, rarely (not in Peru) erect. Leaves aggregated at the nodes or radicle (rarely opposite on the stem), blades linear or subulate as the petioles or narrowly oval to elliptic, shorter than the long, spreading or

[1] *Leucocarpus frutescens* Benth. in A. DC. Prodr. 10: 336. 1846, pertains to *Hemichaena* Benth. "alatus" the only other specific epithet in the genus is in synonymy here.

erect petioles, blades when differentiated from the petioles entire, glabrous, up to about 1–3 mm. long, usually not more than half as wide; flowers solitary, distant or crowded on long or short pedicels, when pedicels short, flowers appearing almost basal; calyx tube campanulate, longer than the 5, very short lobes; corolla little exceeding the calyx, the lips subequal, the 5 lobes shorter than the tube, subequal, the 3 anterior little longer than the 2 posterior, throat open; stamens 4, 2 anterior, 2 posterior, anther cells wholly confluent, much shorter than the filaments and little exserted; ovary globose or globose-ellipsoid, longer or shorter than the style; stigmas subcapitate, the lobes free or united; capsule globose to ellipsoid, seeds brown, numerous, minute, testa reticulate.

Placed in the *Gratiolinae* of the *Gratiolae*, although having the calyx of the *Mimulinae* and sometimes the subcapitate, united stigma lobes of the other sections of the *Scrophularioideae*.

A genus of about 11–15 species (requiring much more analytical study) as interpreted by various authors. Two species are widespread in the new world and both are sporadic in Peru. None of the few collections displays typical characteristics as described for the taxa. It seems better at this time to include them in the species to which they appear closest rather than present them as new taxa. Cosmopolitan, both generically and (frequently) specifically.

Leaf blades oval or elliptical, clearly distinct from the subulate petioles; style little shorter than the ovary, recurved.....*L. aquatica.*

Leaf blades indistinguishable from the petioles; style little longer than to twice as long as the ovary, erect.....*L. subulata.*

Limosella aquatica L., Sp. Pl. 641. 1753. *Limosella australis* R. Br., Prodr. 44. 1810. *L. aquatica* var. *americana* Glück and *L. aquatica* f. *terrestris* Glück, in Notizbl. 12: 75. 1934. *L. americana* and forma Glück, l.c. 12: 76. 1934.

Stoloniferous herb, rooting at the nodes, rarely submerged or partly so, glabrous or almost so. Petioles about 3 times longer than the elliptical, entire blade that reaches up to 17 mm. long; flowers solitary, distant (or clustered); pedicels about half the length of the leaves; calyx tube about twice as long as the 0.5–0.7 mm., acute lobes, campanulate, lobes often reflexed part way; corolla tube about 2 times the length of the ca. 0.5 mm. lobes, little exceeding the calyx and about 2–3 mm. wide (ex diag.), white with purple tinge; stamens little exserted, glabrous; ovary globose, much longer than the 0.2–

0.4 mm. style that is strongly recurved and semi-persistent; capsule globose or broadly ovoid or obovoid, about 3.0–3.5 mm. long.

Only one collection seen. (Arangaro in glaveosis?) *W. Lechler 1877*. June, 1854.

Widely distributed, almost world-wide, growing as a "mat" in muddy places. Possibly conspecific with the following. Most authors maintain these as distinct species on the bases of numerous small differences. The only stable characters thus far found for separating the taxa are in the key. These may be judged insufficient for this purpose. The Australasian based *L. australis* R. Br., could be considered intermediate, but up to now is too poorly known and Brown's description must be considered scanty, in as much as the entire protologue is but 4½ lines long.

Limosella subulata Ives, in Trans. Phys. Med. Soc. N. Y. 1: 440. 1817. *Ygramela maritima* Raf., Atl. Journ. 199. 1833. *Limosella lineata* Glück in Engler, Bot. Jahrb. 66: 505. 1934.

Glabrous herb, acaulescent or stems creeping along the ground, forming linear tufts. Leaf blades and petioles indistinguishable; leaves up to 4 or more cm. long, linear or linear-subulate or rarely aciculiform, entire; flowers solitary, crowded or distant, on pedicels that are longer or shorter than the leaves, up to 4–5 mm. long and 2–3 mm. wide; the weakly reflexed calyx lobes about as wide as the corolla lobes, calyx campanulate, tube 2.0–2.5 mm. long, almost 3 times longer than the acute lobes; corolla white, tube ca. 1.0–1.5 mm. longer than the calyx, the short lobes (ca. 1 mm.) usually obtuse and about half the length of the tube; stamens exserted, anthers one-celled, about a third to a fourth the length of the filiform filaments; ovary ellipsoid to globose, (much) shorter than the erect, 1.5–2.5 mm. style; stigma 2-lobed or lobes united, subcapitate, soon fugacious after fertilization; capsule ovoid to subglobose, ca. 3.0–3.5 mm. long, occasionally little shorter; seeds numerous, brown, minute.

Poorly known from Peru.

Arequipa: Prov. Arequipa, Cerrillo Lavandia, near Laspimas, *Eyedam & Beetle 22154*; Prov. Chuquibamba (Condesuyos), Huario below Chuquibamba, 4,000 m. alt., *Stafford 1152*.—Cuzco: Lauramarca, Cord. Ausangate, *Rauh–Hirsch P1132*. Also reported fide Glück (as *L. liveata*) from Dept. Junin, Prov. Tarma, *Weberbauer*.

This species distributed from the eastern United States, where it is the common representative of the genus, thence sporadically to

Bolivia and Peru with stations in Mexico and Central America. It is also found in the British Isles.

Limosella acaulis Sesse & Mociño (Flora Mexicana 156. 1895.) may be another ecological form of *L. aquatica* L., as suggested by Pennell in Monog. Phila. Acad. 1: 164, 1935. It is a plant of Mexico and the southwestern United States. However, Pennell retained this taxon as a species citing a longer, erect, and slender style in conjunction with narrower leaf blades. If this interpretation is valid this taxon stands between *L. aquatica* and *L. subulata* in approximately the same way as does *L. australis* R. Br. With possible intermediates in both the old and new worlds the status as well as the number of taxa should not be considered as finally resolved. For a more complete discussion of *L. subulata* see Fernald, Rhodora 20: 160–164. 1918, and Pennell, Torreya 19: 30–32. 1919.

LINARIA Mill.

Linaria (Bauhin) Mill., Gard. Dict. ed. 4. 1754.

Erect, glabrous herbs, occasionally inflorescences glandular-pubescent, branching basally, with entire, mostly alternate leaves and zygomorphic, highly modified corollas. Leaves linear, from 5 mm. to 4–5 cm. long and usually less than 1 mm. wide; flowers in racemose or spicate inflorescences, pedicellate, axillary; pedicels up to about 6–7 mm. long or more often short, about 1–2 mm. long, usually shorter than the calyx, always shorter than the corolla with a small leaf-like bract at base; calyx of 5 linear to lanceolate or narrowly lance-ovate sepals, united about a fourth their length into a cupular tube; corolla very zygomorphic, bilabiate, personate, purple, purple-white or white, the anterior (lower) lip 3-lobed, longer than the 2-lobed, reflexed, arching posterior, median lobe longest and widest, all lobes ovate or ellipsoid, obtuse, usually little longer than the cylindric to subfunnelform tube, lower lip with 2 raised ridges (a palate) closing the throat; stamens short, included in the tube, didynamous, inserted near the base of the corolla anterior filaments longer and anthers bigger than the posterior pair; ovary ovoid or globose, equal to or a little shorter than the style, stigma lobes united, punctiform; capsule globose or ovoid, at maturity a little longer than the calyx, dehiscing distally (apically) by irregular pores, loculicidal; seed minute, numerous, testa smooth or tuberculate, angles rounded or sharp, septum persistent, placenta large.

A genus of about 100 species found mostly in the old world. About eight to ten species in the new world of which one occurs in Peru, *L. canadensis* (L.) Dumont.

Only one other species seen from South America (Chile), *L. vulgaris* Hill, whose occurrence is to be expected in our area. For *L. subandina* Diels from Ecuador see under *L. canadensis*. *L. triornithophora* Willd. should be placed in the synonymy of *L. vulgaris*. *L. elegans* Cav. described from Hispaniola and of possible occurrence in Peru is unknown to me.

Linaria canadensis (L.) Dumont Cours., Bot. Cult. 2: 96. 1802. *Antirrhinum canadense* L., Sp. Pl. 618. 1753. *A. canadense assurgens* Raf., Autik. Bot. 155. 1840. *Linaria texana* Scheele,[1] Linnaea 21: 761. 1848. *L. subandina* Diels in Engler, Bot. Jahrb. 37: 47. 1906. *L. canadensis texana* (Scheele) Pennell, Proc. Acad. Nat. Sci. Phila. 73: 502. 1921.

Leaves opposite at or near the base, becoming alternate over most of the length of the plants; calyx lobes 2.5–3.5 mm. long; corolla 8–13 mm. long, varying in color from purple to white and variously purple or white marked; filaments of larger stamens ca. 3 mm. long, the shorter ca. 2 mm. long, anthers of longer stamens about 1½ times the diameter of the shorter; ovary 2–3 mm. long, style usually 1.5–2.5 mm. long; capsule about 4–5 mm. long and in diameter; seeds less than 1 mm. long.

Amazonas: Prov. Chachapoyas, alt. 2,700 m., *Ll. Williams 7547*. —Arequipa: Prov. Islay, near Mollendo, alt. 40 m., *Mexia 7775*.— Huanuco: Prov. Ambo, rock slide, alt. 7,000 ft., *Macbride 3157*. —Junin: Prov. Huancayo, *Soukup 2947*; Mito, stony, grassy slopes, alt. 9,000 ft., *Macbride 3313* and *3380*.—Lima: Lurin, cleistogamous, sandy lomas along the sea, alt. about 200 ft., *Macbride 5927*; Mtn. of San Augustin near Lima, alt. 3,000 m., *Weberbauer 5706*.—Pasco: Prov. Daniel Carrion, Yanahuanca, alt. about 10,000 ft., abandoned field, *Macbride & Featherstone 1249*.—Piura: Prov. Ayavaca, above Ayavaca, alt. 2,800 m., *Weberbauer 6367*.

Usually found in open dry sites, generally distributed in the United States, rare in Mexico and Santo Domingo. Sporadic in South America with only very few but widely distributed collections

[1] *L. canadensis* is said to differ from *L. texana* in seed testa markings and seed angles sharp as opposed to rounded as well as having smaller corolla with shorter spur. These characters intergrade in the United States (center of concentration) and appear to do so also in Peru, the "texana" kind little more frequent in our area.

in Colombia, Venezuela, Brazil, Ecuador, Paraguay, Uruguay, Chile, and Argentina.

LINDERNIA All.

Lindernia All., Misc., Tourin. 3: 178. 1766. *Vandellia L.*, Mart. 1: 12. 1767. *Ilysanthes* Raf., Ann. Nat. 13. 1820. *Bazina* Raf., Autik. Bot. 44. 1844.

Mostly annual herbs, more often glabrous than pubescent, erect, procumbent, repent or prostrate. Leaves opposite, sessile or short-petiolate, usually cut-margined; flowers axillary, solitary, pedicellate or almost sessile; calyx of 5, essentially free or partly united sepals; corolla white, blue or purple and variously marked, zygomorphic, bilabiate, the lips very unequal, posterior erect, of 2, united lobes or lobes slightly bifid, much shorter than the spreading 3-lobed anterior lip, tube cylindric, longer than the lobes; antheriferous stamens 4 or 2, when 2 the anterior reduced to staminodes or sometimes lacking, anterior filaments each sharply inbending, falsely appearing appendaged and forked, posterior pair of stamens often connivent, anther locules proximate, dorsifixed; ovary ellipsoid, shorter than the style that is surmounted by a 2-lobed, lamellate stigma; capsule linear to globose or obovoid, septicidal, the placenta remaining as a plate on the septum after dehiscence, seeds numerous, testa reticulate or pitted.[1]

Four of the over 70 species reported in Peru. A genus with world-wide distribution, mostly old world, especially the Orient. Area of greatest concentration in the new world is in the southeastern United States.

1. Anther-bearing stamens 2, the posterior pair; sepals essentially free ..... *L. dubia.*
1. Anther-bearing stamens 4; sepals united at least part of their length or free.
   2. Anterior stamens smaller than posterior; leaves often as wide as long.
      3. Pedicels 1–2 mm. long; sepals shorter than the capsule; leaves sessile or petiolate ..... *L. diffusa.*

[1] The unfortunate choice of the generic name *Lendernia* by Minod (see under *Stemodia*), is now doubly apparent, especially since both *Lindernia* and *Lendernia* are of concern in the same tribe.

3. Pedicels mostly 10 mm. long or longer; sepals longer than the capsule; leaves short-petiolate ..... *L. crustacea.*

2. Anterior stamens equal to posterior; leaves usually longer than wide ..... *L. thouarsii.*

Lindernia crustacea (L.) F. von Muell., Census 97. 1882. *Capraria crustacea* L., Mant. 87. 1767. *Gratiola lucida* Vahl., Enum. 1: 95. 1804. *Torenia crustacea* (L.) C. & S., Linnaea 2: 570. 1827. *Vandellia crustacea* (L.) Benth., Scroph. Ind. 35. 1835. *Pyxidaria crustacea* Ktze., Rev. Gen. 2: 464. 1891.[1]

Prostrate, repent or erect, essentially glabrous herb of usually dry or occasionally wet sites. Leaves usually short-petiolate, broadly ovate, less than 2 cm. long and almost as wide, obtuse to subacute at apex, broadly obtuse to subtruncate at base, margins irregularly coarsely dentate; flowers axillary, solitary, pedicellate; pedicels elongate, much longer than the calyx, up to 20 mm. long, often 12–15 mm. long, usually erect; calyx of 5, more or less united sepals, usually united at least a third their length, often up to three-fourths, calyx tube usually oblique, mostly splitting along the sepal margins with the developing fruit and sepals frequently appearing to be free in fruit, lanceolate, 3–6 mm. long; corolla about 1½ times longer than the calyx, blue, purple, or lavender, tube usually shorter than or equal to the sepals; stamens exserted, posterior anthers connivent, anterior erect, incurved or connivent, anterior stamens only little shorter than the posterior; ovary ovoid, shorter than the bilamellately stimatic style; capsule conic or obovoid, apex abruptly flatened, the callosed, slightly thickened style base adherent, seeds few, testa pale, pitted, pits descrete.

Junin: Puerto Yessup, alt. ca. 400 m., *Killip & Smith 26349.*— Loreto: Mishuyacu, near Iquitos, alt. 100 m., *Klug 1162* and *1292*; Mouth of Río Santiago above Pongo de Manseriche, alt. 200 m., *Mexia 6104*; along Río Itaya, *Ll. Williams 246*; Lower Río Nanay, *Ll. Williams 443*; Pebas on the Amazon River, *Ll. Williams 1713a*; Leticia on the Amazon River, *Ll. Williams 3037.*

An old world species now generally distributed in the warm-temperate and tropic zones of the world, South Europe excepted.

[1] To list in extended form the checkered synonymic history of this taxon will not serve to better understanding of Peruvian *Lindernia* species so we add merely as a selected list the following: *Morgania lucida* Spreng.; *Torenia lucida* Ham. in Wall; *T. flaccida* Br.; *T. varians* Roxb.; *Vandellia varians* G. Don; *Gratiola aspera* Roth; *Hornemannia aspera* Link ex Otto; *Tittemannia ovata* Reicheb; *Antirrhinum hexandrum* Forsk.

Lindernia diffusa (L.) Wettst. in Engler and Prantl, Pflanzenf. IV(3b): 79. 1891. *Vandellia diffusa* L., Mant. Pl. 1: 89. 1767. *Gratiola origanifolia* Vahl., Enum. 1: 99. 1804. *Bonnaya origanifolia* Spreng., Syst. 1: 42. 1825. *Pyxidaria diffusa* (L.) Kuntze, Rev. Gen. 2: 464. 1891.

Repent herb of usually dry places. Puberulent or pubescent on stems, branches, leaf-margins, veins and calyces; leaves very broadly ovate, subsessile to less often sessile, petiole when present, thinly winged by the leaf base, up to 2 cm. long and only little narrower or sometimes as wide as long, obtuse, margins serrate-crenate; flowers axillary, solitary, subsessile on pedicels that rarely reach 2 mm. long; calyx united up to about half its length or almost free, 5–7 mm. long, lanceolate with long-acute apices; corolla little longer than the calyx, upper part of the tube and lobes exserted, pinkish white or blue and white, variously marked; antheriferous stamens 4, included or exserted, the anterior a little shorter than the posterior; filaments of the anterior adnate almost all their length to the corolla tube and the tube appearing 2-ridged, posterior filaments curving proximally, their anthers connivent; ovary ellipsoid, much shorter than the style, stigma lobes enlarged, clavate-ovate, pubescent; capsule subobliquely ellipsoid, up to 12 mm. long, much exceeding the calyx, the callosed style base when attached only little enlarged; seed numerous, testa tuberculate or with age pitted, pits distant, few; placenta narrow, septum often papery, fugitive.

Junin: Puerto Bermudez, dense forest, alt. ca. 375 m., *Killip & Smith 26589*.—San Martin: San Roque, alt. 1,350–1,500 m., *Ll. Williams 7706*; Tarapoto, weed in pasture, alt. 750 m., *Ll. Williams 5547*.

Widely distributed in the warm-temperate and tropical zones of the world, southern Europe and East Asia excepted.[1]

Lindernia dubia (L.) Pennell, Mono. Acad. Nat. Sci. Phila. 1: 141. 1935. *Gratiola dubia* L., Sp. Pl. 17. 1753. *Capraria gratioloides* L., Syst. Veg. ed. X. 1117. 1759. *Ilysanthes riparia* Raf., Ann. Nat. 13. 1820. *I. gratioloides* (L.) Benth. in DC., Prodr. 10: 419. 1846.[2] *I. dubia* (L.) Barnh., in Bull. Torr. Bot. Club 26: 376. 1899.

[1] Throughout the literature, (Benth., 1846; Wettstein, 1891; Pennell, 1935) the pitting of the seed coat as opposed to tuberculate seed coat has been used to help distinguish taxa. The study of Peruvian (and North American) material has led to the belief that this may be a function of age in various species.

[2] Complete listing of early synonyms for this taxon can be found here. The nomenclature of this and several other taxa in the genus is not yet fully understood.

Decumbent or prostrate, glabrous herb growing near water. Leaf blades sessile, ovate or elliptic-oblong, narrowed to base and apex, only rarely exceeding 2 cm. long, frequently not more than 1.5 cm. long, margins denticulate to subentire; flowers axillary, solitary, pedicellate; pedicels ebracteolate, 5–15 mm. long; calyx of 5 sepals, joined only at the base, appearing free, very narrowly lanceolate, 3–5 mm. long and ca. 0.5 mm. wide; corolla white to pale blue or violet, 6–8 mm. long, tube a little longer than the lobes, cylindric or very narrowly conic; stamens included, only 2, the posterior, antheriferous, erect, filaments filiform, 2 anterior staminodes weakly recurved at apex; ovary shorter than the style, stigma lobes prominent; capsule obliquely ellipsoid, a little longer than the calyx; seed pale brown to almost cream, testa reticulate.

Loreto: Bank of Río Huallaga, alt. 400–800 m., *Klug 4379*; Hera near Moyobamba, alt. 890 m., *Woytkowski 35309*.

Basically a species of the southeastern United States but spreading northward to glaciated areas and west to Texas and Arizona. It has not yet been reported in Mexico or Central America. However, along with a collection from Puerto Rico, it has been found sporadically across South America from the Guianas to the west coast.

L. dubia has been collected also in Europe.[1]

Lindernia thouarsii (C. & S.) Edwin, comb. nov., Phytologia 19: 6, 361. 1970. *Nortenia thouarsii* C. & S., in Linnaea 3: 18. 1828. *Torenia parviflora* Ham. in Wall., Cat. 3958. 1828. *T. nortenia* Stued., Nomen. ed. II. 2: 692. 1841. *T. thouarsii* (C. & S.) Ktze., Rev. Gen. 2: 468. 1891 and Wettst. in Engler and Prantl. Pflanzenf. IV(3b): 79. 1895.

Erect or repent, branched, usually subglabrous annual. Stem apex and upper parts of the branches sometimes sparsely puberulent; leaves less than 2 cm. long about half as wide as long, upper reduced and sometimes narrowly lance-ovate, narrowed to apex, acute to occasionally obtuse at base,[2] subsessile with the leaf blade narrowly winging the very short petiole, or leaves sessile, margins dentate or distantly dentate, rarely costa puberulent beneath; petiole when present often puberulent on the margins and costa, groove obvious;

[1] This taxon is very closely related to *L. anagallidea* (Michx.) Pennell and, in fact, they may be conspecific. If so, this would have no bearing on the nomenclature as *dubia* is the older, acceptable epithet.

[2] Extra Peruvian material with leaf blades usually obtuse at base and with short wingless petioles and blades sometimes exceeding 2 cm. long.

flowers axillary,[1] solitary, pedicellate, in axils of upper leaves that are reduced and bract-like; calyx lobes 5, united most of their length in flower, much less so in fruit, 7–9 mm. long and about 0.5 mm. wide, the costa depressed extending as a sharp mucron, tissue hyaline, the suboblique tube when present consequently 5-angled; corolla little exceeding the calyx, lips blue or violet-blue with rose markings, tube white, narrow anterior lip with the lateral lobes little longer than the median, lobes flattened, corolla throat open; anterior pair of stamens sometimes connivent, posterior usually so; style exceeding the ovary in length, puberulent at apex as the short, abruptly bilamellate style and persisting in fruit, enlarged and callosed at base; capsule narrowly ellipsoid, 4- or 5-angled, usually little exceeding the sepals; seed with testa pitted, pits descrete, seeds round in outline, pale yellow when young.

Peru: San Martín: Zepelachio, near Moyobamba, alt. 1,200–1,600 m., mountain forest, *Klug 4301*.

An old world species especially of Africa and the Indo-Malaya area. A few collections seen from Colombia and one from Bolivia. *Torenia thouarsii* var. *nivea* Pennell, l.c. from Colombia, seems conspecific with our new combination.

Species of *Lindernia* have been collected from sea-level to over 1,000 m. altitude in Peru and from dry to wet as well as open and closed sites. In view of this, it would seem that any taxon of the genus accidentally introduced could establish itself. A likely possibility appears to be the very widespread *L. anagallidea* (Michx.) Pennell.

MAURANDYA Ort.

Maurandya Ort., Nov. Pl. Descr. Decad. 21. 1797. *Usteria* Cav., Icon. et Descr. Plant. Hisp. 2: 15, *t. 116*. 1793.

Ref. Munz, Proc. Calif. Acad. Sci. ser. 4, 15(12): 382–395. 1926.

Woody vines, wood subglabrous or densely soft-pubescent, climbing by means of petioles and pedicels. Leaves alternate, the lowermost often opposite, petiolate, deeply cut-margined, lobed or grossly dentate, broadly ovate or deltoid, up to about 3.5 cm. long and almost as wide near the base, apices acute, bases cordate, hastate, or truncate; petioles lax, up to two-thirds as long as the blade; flowers axillary, solitary, pedicellate; pedicels up to 4 cm. long; calyx lobes

[1] Congested in Colombia (according to Pennell, Proc. Amer. Acad. Sci. Phila. 72: 163. 1920).

5, free most of their length; corolla ample, up to 5.5 cm. long, at least 2.7 cm. long, magenta or bright violet, bilabiate, tube longer than the lips, campanulate or subfunnelform, a little gibbose at base, internally anteriorly, on the floor of the throat with 2 lines of hair or 2-plaited, but the throat not closed, posterior lip 2-lobed, erect, a little shorter than the 3-lobed anterior lip; stamens 4 or 5, the fifth sterile, reduced or lacking, remaining 4 fertile, didynamous, the posterior pair longer than the anterior; ovary shorter than the style, stigma barely 2-lobed, internally stigmatic; capsule globose, 1.0–1.5 cm. long, dehiscing irregularly apically, by 2 pores or slits, thin or firm walled; seeds numerous, corky-tuberculate, ridged or winged.

A genus comprising about ten species, mainly Mexican but extending south to Colombia and north to the United States. A few species are widely cultivated throughout the world. The two species from Peru are said to have been found in the wild state (fide collector) but material seen only from the garden.

Calyx lobes lanceolate; leaves glabrous, deltoid, 3-lobed, the lobes not secondarily toothed; seeds wingless.....*M. barclaiana.*

Calyx lobes ovate; leaves softly pubescent, lobes lacking but margins irregularly grossly dentate; seed winged.....*M. erubescens.*

Maurandya barclaiana Lindl., Bot. Reg. 13: *t. 1108.* 1837. *M. barclayana* in Martens & Galeotti, Bull. Acad. Roy. Brux. 12(7): 3. 1845.

Climbing subshrub with slender, glabrous stems, juvenile frequently reddish. Leaves glabrous, thin, bright green above, paler beneath, triangular-cordate or obscurely 5-lobed, lobes often minutely mucronulate, hastate at base, 1.0–3.5 cm. long and 1–3 cm. wide; petioles 1.0–2.5 cm. long; pedicels glabrous, slender, 3–5 cm. long; calyx tube very short, the sepals free almost their entire length, calyx glandular-villose with multicellular hair, segments linear-lanceolate, 3 upper subequal, ca. 1.0–1.3 cm. long, 2 lower 0.9–1.2 cm. long, curving upward, sometimes reaching 2 cm. long in fruit; corolla 3.0–4.5 m. long, glandular-puberulent externally and pubescent internally above, bright violet, tube swollen at base, 2 prominent, pale plaits anteriorly in the throat, lobes 7–9 mm. long, suborbicular; stamens ca. 1.8 and 2.2 cm. long, filaments yellow, glandular above and densely glandular-pubescent at the bend, usually glabrous at insertion, fifth stamen reduced or lacking; style about equaling the shorter stamens, sparsely glandular-pubescent at base, hair also on

the top of the ovary; capsule globose, ca. 1 cm. long, the 2 valves projecting slightly beyond the style base; seeds oblong, 1.0–1.5 mm. long, with broken, tuberculate, corky ridges, wingless, septum soon deciduous, placenta slender.

Lima: Prov. Lima: in city, in the garden of the British Legation, *Sandeman 4027*.

Maurandya erubescens (Don) Gray, Proc. Amer. Acad. 7: 377. 1868. *Lophospermum erubescens* Don in Sweet, Brit. Fl. Gard. ed. 2. 1: *t. 75*, note. 1830. *L. scandens* Don in Sweet, l.c. *t. 68*. 1830.

Woody vine, slender and densely soft-pubescent on wood, foliage, and in the inflorescence. Stems soft, glandular-puberulent to pilose; leaves chartaceous, triangular-hastate to cordate or obscurely 5-lobed, about 3 cm. long and 2 cm. wide,[1] acuminate at apex, subcordate at base, petioles almost as long as the blades; flowers solitary, axillary, pedicellate; pedicels up to ca. 5 cm. long, lax and sometimes glandular-pubescent, ebracteolate; the 5 calyx lobes 15–20 mm. long, free most of their length, densely pubescent on both surfaces, broadly ovate, acute; corolla magenta, up to 5.5 cm. long, as the calyx internally pubescent with multicellular hairs, tube 2.5–4.0 cm. long, campanulate, gibbose for about 1 cm. of its length at the base, constricted above gibbosity then broader, lobes about 1 cm. long, upper 2 erect-reflexed, lower 3 erect and little exceeding upper or occasionally lobes subequal, throat internally with 2 plaits of golden-yellow hairs anteriorly; stamens included, 4 fully developed, didynamous, the fifth when present about 2–3 mm. long, reaching the bend of the filaments of the 4 expanded stamens, filaments glandular above, densely pubescent beneath, anther-sacs discrete, circular after dehiscence; pistil equaling the stamens, ovary glandular-pubescent, stigma bifid; capsule globose, pubescent, ca. 1.5 cm. long, dehiscing by 2 irregular slits; seeds oblong, corky, tuberculate with emarginate and lacerated wings, placenta thin.

Lima: Prov. Lima, in city, garden of British Legation, *Sandeman 4026*.

Apparently naturalized in Colombia. This species found throughout Mexico and Central America; the preceding restricted to Mexico in the wild state.

The common "snapdragon," *Antirrhinum majus* L., So. Pl., 617. 1753, a native of the Mediterranean area is widely cultivated in gar-

[1] Reaching 15 cm. long and wide outside Peru, margins and pubescence also differing in extra-Peruvian collections.

dens in Andean Peru along with *A. virga* Gray, Proc. Amer. Acad. 7: 373. 1868, in numerous varieties and color phases. Permission was not granted the writer to collect. This genus may be separated from *Maurandya* as follows:

Leaves entire, lanceolate to linear; corolla with a definite palate, closing the throat.....*Antirrhinum.*

Leaves triangular-hastate, often lobed or coarsely toothed; corolla with a palate of 2-plaits or lines of hair,[1] not closing the throat. *Maurandya.*

MICRANTHEMUM Michx.[2]

Prostrate herb, forming mats and rooting profusely at the nodes, glabrous or almost so. Leaves opposite, sessile; flowers axillary, solitary, sessile or more often very short-pedicellate, minute, ca. 2 mm. long; calyx of 4 sepals united only at base; corolla dull white, tube very short, anterior lobes united much farther than the 3 posterior that are united only half-way, lobes usually flattened; stamens 2, the anterior-lateral pair, appendaged near the base due to the sharp infolding of the filament and the free portion knot-like, anthers minute, divergent, proximate; ovary globose-obovoid about equal to the style in length, stigma lobes free, somewhat reflexed, pubescent; capsule globose, a little shorter than the sepals, irregularly dehiscent and 1-celled by suppression of the septum; seed oblong, apiculate at one or both ends, light brown, prismatic, finely striate.

A genus of two (or three) species of eastern North and South America and Cuba; one of these in Central America. Sporadically collected in South America westward to eastern Peru.

A single species in Peru, *M. umbrosum.*

Micranthemum umbrosum (Walt.) Blake, Rhodora 17: 131. 1915. *Anonymos umbrosa* Walt., Fl. Carol. 62. 1788. *Globifera orbiculatum* Michx., Fl. Bor. Amer. 1: 10. *t. 2.* 1803. *Micranthemum emarginatum* Ell., Sketch Bot. S. Car., Ga. 1: 18. 1816.

[1] Palate closing the throat developed in *M. antirrhiniflora* H. & B., a species unknown in Peru. These two genera are not so easily separable on a world-wide basis. For a complete analysis of new world material see Munz, 1926 (cited at the beginning of this genus) and Pennell 1935.

[2] *Micranthemum* Michx., Fl. Bor. Amer. 1: 10. t. 2. 1803. conserved over *Anonymous* Walt., Fl. Carol. 62, 1788 and *Globifera* J. F. Gmel., Syst. Plant. 2: 32. 1791.

Stems and branches striate-striatulate. Leaves orbicular or sometimes very broadly ovate, margins entire or weakly sinuate; sepals about 1 mm. long and 0.5 mm. wide, ellipsoid or oblong, narrowed to base, apices usually acute; corolla about 1.5–2.0 mm. long, the anterior lobe rarely bifid, internally sometimes puberulent at or near the throat; stamens reaching the lower part of the lobes.

San Martin: Prov. San Martin, near Tarapoto, *Spruce 4152*.[1]

M. rotundatum Wright, the outer generally accepted species of the genus is found mainly in Cuba.

MIMULUS L.

Mimulus L. Sp. Pl. 2: 634. 1753. *Monavia* Adans., Fam. Pl. 2: 211. 1763.

Annual or occasionally perennial, glabrous, repent herbs of wet sites, frequently rooting at the lower nodes.[2] Leaves opposite, mostly petiolate, toothed, upper sometimes much reduced; flowers solitary, axillary, pedicellate; calyx campanulate, 5-angled, 5-toothed, mostly plicate, persistent and accrescent (in fruit), teeth very unequal; corolla yellow, 0.7–2.0 cm. long, bilabiate, tubular, tube slender, included in the calyx or exserted, gradually expanding into a long, open throat, upper lip 2-lobed, the lower lip longer, heavily bearded in 2 patches, 3-lobed, median lobe longest; stamens 4, didynamous, included or exserted; filaments glabrous, adnate to the lower part of the corolla; anthers 2-celled, confluent at the apex, bases more or less divaricate; ovary shorter than the long, slender style, stigma 2-lobed, lobes equal or unequal, style longer than the stamens; capsule oblong, loculicidal to the base along both sutures, placenta united in a central column; seed numerous, small, longitudinally striate.

A basically temperate zone genus of about 120 species with the main concentration in California, the western United States, and Mexico, and a secondary area in Chile and west-coast South America. Occasional also in most of the temperate areas of the old world, Europe, and northwestern Africa excepted.

A single species (common) in Peru, *M. glabratus*.

Mimulus glabratus HBK., Nov. Gen. et Sp. 2: 370. 1817; Benth., Scroph. Ind. 28. 1835; Gray, in Bot. Mex. Bound. 116. 1859;

[1] Specimen in British Museum.

[2] The genus *Mimulus* varies widely and may range from herbaceous annual to shrubby. For this genus it is particularly important that the reader is aware of the narrow description.

Conzatti & Smith, Fl. Sin. Mex. 117. 1897. *M. andicolus* HBK., Nov. Gen. et Sp. 2: 370. 1817. *M. parviflorus* Lindl., Bot. Reg. *t. 874*. 1825. *M. propinquus* Lindl., Bot. Reg. 1: 1330. 1830. *M. luteus* var. *micranthus* Phil., Linnaea 29: 28. 1857. *M. kingii* Phil., An. Univ. Chil. 43: 528. 1873. *M. tener* Phil., An. Mus. Nat. Chil. 1: 70. 1891.[1]

Stoloniferous or with creeping stems, up to 4 cm. long. Leaves mostly broadly ovate, mostly 1.5–4.0(5.0) cm. long and 0.8–3.0 cm. wide, irregularly dentate, sometimes shallow-lobed at the base; basal leaves cuneate, subcordate; petioles margined, shorter than the blade; upper leaves sessile, subcordate; pedicels slender, longer or shorter than the leaf blade; flowers mostly on upper part of stem; calyx often red-spotted, campanulate in flower, 5–8 mm. long, broadly oval in fruit, 1.0–1.2 cm. long, teeth broad, spreading, very short, uppermost 2 or more times longer than the others, broadly rounded, sometimes mucronate; corolla early deciduous; style glabrous; capsule rounded, constricted at base, not stipitate, shorter than the calyx tube.[2]

Apurimac: Prov. Abancay, alt. 3,200 m., *C. Vargas C. 759*.— Arequipa: Prov. Condesuyos, Chuquibamba, alt. 7,000 ft., *Stafford 1176*; Pichu Pichu slopes, alt. 10,000 ft., *Sandeman 3759*.—Cuzco: Prov. Canchis, Uyamiri, Sicuani, 12,000 ft., *Stafford 959*; Cerro de Colquipata, alt. 3,400–3,700 m., *Pennell 14181*; San Geronimo, alt. 3,200–3,300 m., *Pennell 14204*; Oropesa, alt. 3,200–3,300 m., *Pennell 14200*; La Ruya, wet *Distichia* moor, alt. 4,200–4,300 m., *Pennell 13485*; Sin. Loc.: *Stafford 1245; Sandeman 3358*.—Huancavelica: Prov. Taycaja, hills N. of Pampas, alt. 3,250 m., *Stork & Horton 10246*.— Huanuco: Prov. Huanuco, Huacho 8 km. N. of Huanuco, alt. 1,900 m., *Stork & Horton 9408*; Muña, shallow brook margin, in flat mats, alt. about 7,000 ft., *Macbride 3983*.—Junin: Huancayo, alt. 3,317 m., *Soukup 2945*; Mito, sunny, mossy bog, alt. about 9,000 ft., *Macbride & Featherstone 1541*.—Lima: Canta, corolla "lemon-chrome" with maroon dots, alt. 3,000–3,200 m., *Pennell 14608*.—Loreto: Creek edge, alt. about 15,000 ft., *Macbride 2999*. —Moquequa: Ilo, sea level, bank of stream, *Stafford 929*.—Puno: Chuquibambilla, in rivulet on puna, alt. 3,850–3,900 m., *Pennell 13390*; Araranca, alt. 4,100–4,200 m., *Pennell 13427*; San Antonio de

[1] Also *Mimulus jamesii* var. *texensis* Gray; *M. glabratus* var. *parviflorus* (Lindl.) Grant; *M. glabratus fremontii* (Benth.) Grant; *M. glabratus michigamensis* Pennell; *M. inamoenus* Greene.

[2] Both the generic and specific descriptions largely from Grant, A. L., *Monograph of the Genus Mimulus*, An. Mo. Bot. Gard. 11: 99–388. 1924.

Esquilache, in streams, alt. 12,000 ft., *Stafford 755*[1]; Jesus Maria, Huancarani Valley, rocky cliffs, alt. 12,000 ft., *Stafford 755*[1]; Juncal, below San Antonio de Esquilache, wet slopes and bogs, alt. 14,000 ft., *Stafford 1143*,[2] Viso, among rocks in shallow brook, alt. about 9,000 ft., *Macbride & Featherstone 604*; near Puno, alt. 4,000 m., *Soukup 459*.

All of the remaining seven species of *Mimulus* from western South America could be expected to occur in Peru. Of the eight species reported in this area, six have been collected thus far in Chile. Seven of the eight pertain to the section *Simiolus*, only *M. bridgesii* is placed in section *Paradanthus*. This latter species is distributed from Central America to Chile.

ORTHOCARPUS Nutt.

Annual herbs, erect and branching from near the base or unbranched. Leaves alternate, linear or linear-lanceolate, entire or pinnatifid, sessile; flowers in dense or interrupted, narrow spikes, subtended by purplish bracts; calyx tubular-campanulate, 4-cleft, lobes linear; corolla purplish, narrow, upper lip galeate, erect, entire, little longer than the 3-saccate, lower lip; stamens 4, didynamous included in the galea, anthers glabrous, sacs unequally placed, upper medianly attached; pistil included in the galea, style filiform, stigma globose; capsule loculicidal, ovoid, shorter than the calyx; seeds numerous, testa loose, brown, reticulate.

A genus of 25 species, predominantly western North American, one of which occurs in the Andes of Chile and Peru, *O. laciniatus*.

Orthocarpus laciniatus (H. & A.) Keck, Proc. Calif, Acad. Sci. ser. 4, 16(17): 548. 1927. *Castilleja laciniata* H. & A., Bot. Beech., 40. 1830. *Oncorhynchus pinnatifidus* Lehm., Ind. Sem. Hort. Hamb., 1832. *O. tenellus* Pisch. & Mey., Ind. Sem. Hort. Petrop. 1: 35. 1835. *Orthocarpus australis* Benth. in DC., Prodr. 10: 537. 1846; S. Wats., Bot. King's Exp., 459. 1871.

Branched or unbranched (rarely) annual with pilose stem and often pubescent foliage, appearing hazy-purple in mass. Leaves linear or linear-lanceolate, lower entire, upper pinnatifid with 2–4 linear-filiform divisions, 1.5–4.5 cm. long, usually short-hispid, vary-

[1] Duplicated number, both collected on May 19, 1937.

[2] Collected November 28, 1937, indicating either a six-month flowering period or more than one flowering period for this species.

ing from sparsely hispidulous to densely lax-pubescent; spike narrow; flowers sessile or almost so, subtended by lanceolate or lance-ovate bracts with 3–5 divaricate, linear-attenuate divisions, bracts green and purple or rose-purple tipped, longer or shorter than the flower; calyx 1.4–2.2 cm. long, soft-pubescent, lobes linear, attenuate, the tube cleft about halfway medianly and little less laterally; corolla purplish, narrow, 12–25 mm. long, galea 1.5–2.0 mm. longer than the lip, slightly falcate, narrowed apically, puberulent to pubescent externally, the wide, scarious margins excepted, densely pubescent internally, lip shallowly 3-saccate, teeth 1–2 mm. long, oblong, erect, basally purple; anthers glabrous, linear, ca. 1.5 mm. long, upper sac attached dorsally, medianly, lower almost apically, filaments ciliate; capsule ovoid, 8–14 mm. long, shorter than the calyx, glabrous; seed oblong-ovoid, narrowed to the funicular end.

High elevations from northern to southern Peru (and into Chile) in open, dry sites.

Cajamarca: Celendin, ca. 2 km. on track to Balsas. Flowers purple and yellow, alt. ca. 2,700 m., *Hutchison & Wright 5156*; gorge of Río Marañon, 3–4 km. below summit of Balsas–Celendin road, overlooking Balsas, alt. 2,950 m., *Hutchison & Wright 5267*.—Cuzco: Anta Prov., Huarocondo, alt. 3,200 m., *Herrera 3633*.—Huancavelica: Castrovirreina Prov., above Pisco, above Huaytara, alt. 2,700–2,800 m., *Weberbauer 5416*.—Junin: La Aroya, base of limestone cliffs, alt. ca. 12,000 ft., *Macbride & Featherstone 965*.—Libertad: Huamachuco Prov., summit above Arecapampa, on road to Huamachuco, alt. 3,970 m., *Hutchison & Wright 6266*.—Lima: Matucana, alt. about 8,000 ft., *Macbride & Featherstone 152*.—Pasco: Huariaca, alt. about 9,500 ft., *Macbride 3114*; Yanahuanca, alt. about 14,000 ft., *Macbride & Featherstone 1164*.—Sin. Loc.: *Weberbauer 5416*.

OURISIA Comm. ex Juss.

Ourisia Comm. ex Juss., Gen. 1: 100. 1789, *Dichroma* Cav., Icon. 6: 59, *t. 582*. 1801.

Small erect, repent or caespitose herbs, rarely becoming woody at base, caulescent or acaulescent. Leaves mostly opposite, narrowly ovate to almost round, 2–3 mm. to 10–12 mm. long and usually little narrower, varying from about half as wide as long to sometimes as wide as long, usually long-petiolate below to sessile above, the lower petioles sometimes longer than the blades, glabrous to densely long-

pubescent, mostly obtuse at both ends, less often acute at the apex, infrequently so at base; flowers mostly less than 12 mm. long, pedicellate, solitary and axillary or terminally forming short racemes, or subumbelliform and pedunculate; calyx 5-lobed, longer or shorter than the corolla tube, lobes imbricate to almost valvate, calyx tube shorter than the oblong or narrowly ovate lobes; corolla 5-lobed usually red or scarlet, sometimes white, rarely orange or yellow, bilabiate, the lips equal or unequal, tube longer than lobes, throat internally glabrous and open or densely pubescent and wholly or partly closed; stamens 4, didynamous, included or exserted, the pairs almost equal in length, filaments inserted about halfway from the base[1] or near the base of the corolla anthers divaricate; stigma lobes united, style longer than the ovary, sometimes equaling or exceeding the stamens; capsules loculicidal, ovoid or oblong, occasionally orbicular, placenta thickened, septum semi-persistent, papery; seed numerous, testa loose, reticulate.

A genus of about 30 species with greatest concentration in northern and western South America, extending to the Antarctic region and New Zealand (six spp.). This genus exhibits the same transpacific discontinuity as *Calceolaria* and the *Veronica–Hebe* complex (see below).

1. Corolla internally pilose, the pubescence at least partly closing the throat; style shorter than the corolla tube.
   2. The 3 anterior lobes of the corolla emarginate or obcordate; calyx subtended by 2 cupular, sheathing bracts. . . *O. muscosa.*
   2. Corolla lobes rounded or obtuse; calyces ebracteate.
      3. Pedicels shorter than the subtending leaves; calyx about equaling the corolla tube in length; lips of the corolla subequal; a staminode sometimes present; plants repent. *O. biflora.*
      3. Pedicels longer than the subtending leaves and usually longer than the flowers; calyx much shorter than the corolla tube; lips of the corolla unequal; staminode always lacking; plants caespitose, erect. . . . . *O. pratioides.*
1. Corolla internally glabrous, throat open; style longer than the corolla tube. . . . . *O. chamaedrifolia.*

[1] Rare in the family, usually inserted at or near the base of the corolla.

Ourisia biflora Wedd., Chlor. And. Nov. 2: 117. 1857.

Villose, repent, very short-caulescent, annual herbs. Leaves ovate, or especially the upper, obovate-cuneate, minute to 8 mm. long, crenate, apex obtuse, narrowed to base, petiolate; petiole shorter than the blade; flowers axillary, pedicellate, most often 2 in each axil, sometimes one, clustered at the apices of the branches; calyx lobes densely villose, lanceolate or oblong, 4.0–5.5 mm. long, as long as the corolla tube, united only near the base; corolla white, reverse pink or violet (fide coll.), 5.0–6.5 mm. long, lobes about 1.0–1.5 mm. long, lips subequal, anterior lip 3-lobed, lobes broadly ovate, sinuate, posterior lip (upper) 2-lobed, lobes little narrower than the anterior, throat closed by dense, soft, white pubescence, tube subfunnelform; fertile stamens 4, didynamous, included in the tube, filament black; style little longer than the ovary, equaling or little shorter than the filaments; capsule unknown.

Sin. Dept.: Limbani, among rocks, alt. 14,500 ft., *Stafford 1112*.

Described from Bolivia, Dept. La Paz, no other collections known.

Ourisia chamaedryfolia Benth. in DC., Prodr. 10: 493. 1846.

Creeping, annual, branching herb, stem glabrous or sparsely to densely beset with multicellular, soft pubescence. Leaves ovate or oblong-spathulate, glabrous, hirtellus or soft-pubescent on the crenate margins, up to 1.2 cm. long, usually shorter and 2–5 mm. wide, apices subacute to acute, bases attenuate or obtuse, tissue frequently punctate, more densely beneath than above, punctations black; flowers 1.7–2.1 cm. long, solitary, axillary, pedicellate; pedicels up to 2.8 cm. long, much longer than the subtending leaves, sparsely pilose with multicellular hair; calyx 6–8 mm. long, sepals glabrous and ciliolate, oblong, subacute, united up to about a third their length into a loosely investing tube; corolla glabrous or sparsely puberulent, scarlet or orange, tube salverform or almost cylindric, 11–13 mm. long, throat open, glabrous, lobes 2–3 mm. long, hemispheric, margins entire, lips equal or unequal; stamens exserted, the filaments inserted about half way from the base of corolla tube, didynamous, the pairs subequal in length, anterior barely longer; style exserted beyond the corolla, 13–16 mm. long, ovary ovoid, ca. 2–5 mm. long, stigma punctiform; capsule ovoid, glabrous, about as long as the calyx, septum deciduous, placenta little thickened; seeds irregular or subtrigonous, angles obtuse. Two clearly distinguished varieties in Peru.

Sepals pilose, eciliolate; corolla lips very unequal; stamens about equaling the corolla tube in length; leaf blade obtuse at base. *O. chamaedrifolia* var. *chamaedrifolia.*

Sepals glabrous, ciliolate; corolla lips equal or almost so; stamens usually a little longer than the corolla tube; leaf blade attenuate at base ..... *O. chamaedrifolia* var. *elegans.*

Ourisia chamaedrifolia Benth. var. **chamaedrifolia.**

Leaves ovate, base obtuse; petioles terete and differing further from var. *elegans* as in the key.

Apurimac: Salcantay, humid rocks, 4,300–4,500 ft., *Rauh–Hirsch P1409.*

Ourisia chamaedrifolia var. **elegans** Wedd., Chlor. And. Nov. 2: 114–115. 1857.

Leaves oblong-spathulate, base attenuate; petioles flattened.

Cuzco: Marcapata. River bank, in moss under rocks, trailing growth, 10,000–12,000 ft., *Stafford 987.*

Ourisia muscosa Benth. in DC., Prodr. 10: 493. 1846.

Repent, trailing herb, rooting at the nodes, glabrous or pilulose, stems a few cm. long, the flowers on erect pedicels. All parts minute; leaves 1–3 mm. long on petioles that are thickened and shorter or more often longer than the ovate or broadly oval, entire blades, apices rounded, little narrowed to base; flowers axillary, solitary, pedicellate, 4–6 mm. long; pedicels of mature flowers 1–10 mm. long with a pair of sheathing, cupular bracts apically, usually glabrous, thickened and flattened; calyx 2.0–2.5 mm. long, glabrous, tube almost lacking, segments ovate, acuminate, 1-nerved; corolla tube white, glabrous, salverform, ca. 4 mm. long, lips subequal, throat densely villose internally and at the base of the minute lobes, the 3 anterior lobes apically emarginate or obcordate; stamens included, barely reaching the throat of the corolla, filaments black; style little shorter than stamens, longer than the globose, apically grooved ovary; capsule not seen, ex desc. equaling the calyx lobes.

Arequipa: Pichu Pichu Range in boggy ground, alt. 13,500 ft., *Stafford 691.*—Puno: San Antonio de Esquilache, alt. 16,000 ft., *Stafford 800.*

This species, beside its very small size, can easily be distinguished by its emarginate or obcordate anterior corolla lobes, and cupular

bracts that sheathe the calyx lobes. Known also from Bolivia and Ecuador.

Ourisia pratioides Diels in Urban, Pl. Nov. And. in Engler, Bot. Jahrb. 37: 428. 1906.

Ex desc. Caespitose, villose herb, stems procumbent, 4–8 cm. long, apices ascending, 1-flowered. Leaves opposite, lower petiolate, suborbicular, 3–4 mm. long and wide, almost entire, villose above, glabrescent beneath; petioles dilated at base, villose, 5–6 mm. long, upper leaves sessile or subsessile, margins obsoletely crenate; calyx pilulose, tube about 2 mm. long, the obtusish segments 3–4 mm. long; corolla pale purple, lips unequal, tube 5–7 mm. long, internally pilose, the 2 lateral posterior lobes about 4 mm. long, internally barbed, smaller, and fused farther than the 3 lower lobes that are 6–8 mm. long and elliptical with the median a little bigger than the lateral; stamens 6–7 mm. long; ovary glabrous.

Huanuco: Prov. Huamalies, mountains of Monzón, alt. 3,300–3,400 m., *Weberbauer 3724*.

Only description and photograph of the type seen. This taxon appears to be closest to the Bolivian species, *O. pulchellum* Wedd., where the leaves are larger, not villose above and the stamens and petioles are longer.

PORODITTIA G. Don

Porodittia G. Don, Gen. Syst. 4: 608. 1838, based on *Jovellana* Cav., Icon. et Descr. 5: 32, *t. 453*. 1799. *Calceolaria* Vahl, Enum. 1: 81. 1804. *Baea* Pers., Syn. 1: 15. 1805, non Comm. ex Juss. *Trianthera* Wettst. in Engler & Prantl, Pflanzenf. IV(3b): 155. 1891. *Stemotria* Wettst. & Harms in Engler & Prantl, Pflanzenf. Reg. II–IV: 462. 1898.

Erect, much branched shrub or woody vine, puberulent on wood and foliage, often glandular-puberulent in the inflorescence, wood often glabrate with age near the base of the plant, estriate, terete, usually drying brown. Leaves opposite, variously ovate or elliptic in outline, margins irregularly deeply toothed or lobed, teeth usually sharp, sinuses often wider than the teeth, petiolate; petioles often at least partly, sometimes entirely, surrounding the stem as a thin or wide collar, rarely only little dilated at base; inflorescences large, many-flowered, irregularly branching cymes, terminal on branches,

axils subtended by progressively reduced leaves to the apex; pedicels and peduncles progressively shorter to the terminal pedicel; flowers zygomorphic, mostly over 1 cm. in diameter; calyx of 4 sepals, united only near the base; corolla yellow and variously violet- or brown-striped or -blotched, bilabiate, the lips cut almost to the base, upper 2-lobed, lower 1-lobed, lips little rounded-saccate, tube very short; stamens 3, inserted at the base of the upper lip of the corolla, 1 median and 2 lateral, filaments short, flattened, exceeded by the subcompressed, parallel anthers that dehise by large apical pores; ovary ovoid, shorter than the style, stigma lobes united, minutely punctiform; capsule ovoid, bilocular and bivalved, valves bifid at apex; seeds very small.

A monotypic genus (*Porodittia triandra* (Cav.)), G. Don endemic in Peru.

Porodittia triandra (Cav.) G. Don, Gen. Syst. 4: 608. 1838. *Jovellana triandra* Cav., Icon, & Descr. 5: 453. *t. 32.* (pro parte) 1799. *Baea triandra* Pers., Syn. 1: 15. 1806. *Calceolaria triandra* Vahl, Enum. 1: 181. 1804. *Trianthera triandra* Wettst. in Engler & Prantl, Pflanzenf. IV(3b): 155. 1891.

Leaves up to 5–6 cm. long and 3 cm. wide, often shorter and narrower, variable in size; petioles 6–15 mm. long; calyx lobes broadly ovate, acute, ciliolate, subequal, densely puberulent-pubescent, about 4 mm. long, posterior sepal a little smaller, anterior a little bigger than the lateral; corolla not or only very little calceolate but mimicking *Calceolaria*, lips open, upper, the posterior, 2-lobed about 2 times wider than the 1-lobed anterior lip that is composed of 3 fused petals, posterior lobes free at least half way to the base, tube very short; filaments about 1 mm. long, anthers about 1.5–2.0 mm. long and almost as wide, yellow or blue; ovary glandular-pubescent; capsule ovoid, abruptly narrowed to a long-acute apex, much exceeding the calyx; seeds numerous, septum adherent, placenta much enlarged at base.

Ancash: Prov. Bolognesi, Matarragra N. of Chiquián, alt. 3,250 m., *Ferreyra 5583.*—Ayacucho: Coracora, alt. 3,200 m., *Weberbauer 5810.*—Lima: Prov. Huarochiri, Circa Llacllishi, alt. 2,700–2,800 m., *Pennell 14527*; Along Río Chillon, above Obrajillo, alt. 2,700–3,000 m., *Pennell 14362*; One league from Obrajillo, *Nee s.n.*; Near Antaicocha, Cerro Colorado, E. of Canta, alt. 3,200–3,400 m., *Pennell 14622.*—Sin. Depto.: Viso, alt. about 9,000 ft., *Macbride & Featherstone 578.*

RUSSELIA Jacq.

Plants shrubby or scandent, with terete or angled stems that are often ridged and striate between the ridges. Leaves opposite or verticillate; inflorescence axillary, cymose and most often branched; calyces deeply 5-parted, persistent; corolla tubular or funnelform, slightly irregular, upper lip emarginate, lower 3-lobed; stamens 4, didynamous, inserted 1–2 mm. above base of the corolla; staminode usually short; ovary 2-loculed; fruit a globose capsule, loculicidal, placentae enlarged, bearing numerous hairs among the many, small wingless seeds.[1]

A new world genus of 52 species, native from Mexico to northern South America including the West Indies. However, several species are now in cultivation in many parts of the world.

Divided into two subgenera by Dr. Carlson (see footnote for generic description). Only the first of these, *Juncirusselia*, now pertaining. Its one species, *R. equisetiformis* S. and C., the only representative so far from Peru. This species has an unique habit for the genus.

Juncirusselia Carlson. Plants junc-like, stems thin, numerous verticillate. Inflorescence 2-flowered.[2] Corolla glabrous internally.

Russelia equisetiformis S. and C., Linnaea 6: 377. 1831. *R. juncea* Zucc., Flora 15, Beibl. 2: 99. 1832.

Subshrub up to about 1 m. tall, glabrous or almost so, profusely branched, stems and leaves verticillate below and opposite above, stems (in life) green, 4–12-angled with prominent ridges on the angles and striae between. Leaves caducous, ex desc. lower leaves 3–6 in a whorl, ovate or elliptical-acute, larger with one or a few teeth on each side, 8.5–15.0 mm. long and 6–9 mm. wide, upper smaller, linear, entire, with a few circular resin dots; petioles 3–4 mm. long, often remaining appressed after leaves fall; inflorescences mostly apical; bracteoles at bases of peduncle and pedicels, reduced, linear or narrowly lanceolate, entire, resin-dotted; peduncles short, 3–4 mm. long or elongate up to 2 cm. long; pedicels shorter; calyx lobes ovate, acute or mucronate, 2–3 mm. long, much exceeding the short tube;

[1] Generic description for this genus is very broad (an exception to the rule that descriptions are limited to Peruvian material) and follows Carlson, M. C., *The Genus Russelia* in Fieldiana: Botany 29(4): 231–292, 6 pl. 1957. This course is taken because the only species of *Russelia* thus far reported is exceptional in the genus (standing as a monotypic subgenus) and it seems likely that at least one other species will soon be collected in Peru.

[2] Sometimes more than two-flowered in cultivation.

corollas red, 1.5–2.5 cm. long, anthers orbicular; staminode subobsolete, 0.5–0.7 mm. long; pistil about equal to the shorter stamens, style much longer than the ovary, stigma with 2, small lobes often coherent, appearing punctiform or lamellate; capsule ex desc.,[1] globose 3–6 mm. in diameter, lower third in the persistent calyx, style persisting at apex; seed small oval, testa warty, light brown, among white hairs that fill the capsule.

Lima: Botanical Gardens in Lima at 150 m. alt., *Soukup 2919.*— Loreto: Iquitos and vicinity, alt. 120 m., *Ll. Williams 3582.*

Generally distributed from Mexico through Central America and the West Indies to the Guianas, Colombia, and Peru. Cultivated in numerous other parts of the world. Frequently collections from the natural range are prepared from cultivated material although collectors often neglect to note this.[2]

Other species which may likely be found in Peru are *R. sarmentosa* Jacq. and *R. coccinea* Wettst., basically Central American but occurring in diverse ecologic sites. These pertain to the subgenus *Eurusselia* Carlson.

SCOPARIA L.

Ref. Chodat, R. Bull. Herb. Boiss. 2(8): 1–16; 85–89. 1907–1908.

Shrub or subshrub woody only at base, subglabrous. Stems terete, branches terete or 4-angled, longitudinally striate, when winged the wings sometimes strongly ridged; leaves decreasing in size base to apex, opposite or ternately verticellate, especially the upper; flowers pedicellate, usually 2 or 3 in each leaf axil, often appearing clustered; pedicels frequently shorter than the bracts and longer than the calyx, only rarely exceeding 3 times longer than the calyx, usually very sparsely puberulent with stiff hairs, occasionally vesture dense; sepals 4,[3] due to loss of the posterior, imbricate, usually united only at the base, thinly scarious margined and ciliolate; corolla subrotate, 4-lobed due to loss of posterior petal, white, internally beset with longish hairs at the base of the lobes, petals frequently reflexed, at least when dry; stamens 4, inserted on the base of the short corolla tube but alternating with the lobes, filaments filiform, anthers subsagittate, parallel, dorsifixed, proximate; style erect, usually little

[1] Both mature lower leaves and capsules wanting in Peruvian collections.

[2] Fide Carlson, l.c.

[3] Sepals sometimes 5, in extra Peruvian material.

longer than the ovoid to globose ovary, stigma lobes short, truncate, free at the tips but appearing united, punctiform or clavate; capsule septicidal and secondarily barely loculicidal at the apex, ovoid or globose, seeds numerous, furrowed, ovoid, placenta well developed.

A single species *S. dulcis* L., well represented and of broad distribution in Peru. The genus is widely distributed in the warm temperate and tropical regions of the world. Its greatest concentration, about 10 species, is in the Western Hemisphere in Argentina and Paraguay. Only *S. dulcis* L. reported from North Africa, India, China, Philipine Islands, Malaya, and Australia.

Scoparia dulcis L., Sp. Pl. 116. 1753; Gen. Pl. ed. 5. 83. 1754. *S. ternata* Forsk., Fl. Aeg.-Ar. 30. 1775. *Gratiola micrantha* Nutt., in Amer. Journ. Sci. 5: 287. 1822. *Scoparia grandiflora* Nash, in Bull. Torrey Club 23: 105. 1896.

Largest leaves up to 5 cm. long, blades mostly 1.0–3.5 cm. long, narrowly lance-ovate to ovate, uppermost sometimes lanceolate, apex usually acute, cuneately narrowed to the short petiole, margins deeply, irregularly serrate (the larger leaves) to serrate-serrulate (the smaller, upper), glandular-punctate; pedicels up to 9 mm. long; calyx lobes about 1.5–2.0 mm. long, elliptic to elliptic-ovate, 3-nerved; corolla white, 4–10 mm. wide, lobes almost equal, ovate; stamens with the filaments about 2 times longer than the anthers; capsule 1.5–2.5 mm. long; seeds yellowish brown.

Cuzco: Valle del Urubamba, 2,200 m., *Herrera 3200*; Prov. Quispicarchis, Quinco Mic, 800–900 m., *C. Vargas C. 9759*.—Junin: Chanchamayo Valley, *Carlos Schunke 374*; 1,200 m., *Carlos Schunke 398*; La Merced, alt. 4,000 ft., *Macbride 5669*.—Loreto: Along Río Itaya, *Ll. Williams 131*; Lower Río Nanay, *Ll. Williams 450, 726*, and *1300*; Santa Ana on Upper Río Nanay, *Ll. Williams 1250*; On the Amazon River, San Salvador, *Ll. Williams 1862*; Pro *1982*; La Victoria *2653*; Lower Río Huallaga, 155–210 m., *Ll. Williams 4362*.—Piura: Nigritos,[1] *Haught F-40*[2]; Pariñas Valley, *Haught F-40*[2]; Talara, alt. 500 m., *Rauh-Hirsch C 26*.—San Martin: Prov. Tingo Maria, Monson R. near Tingo Maria, alt. 625–1,100 m., *Allard 21157*; Lima, 840 m., *Ll. Williams 6480*; San Rogue, 1,350–1,500 m., *Ll. Williams 7707*, Alto Río Huallaga, alt. 360–900 m., *Ll. Williams 5623*.—Sin. Depto.:

[1] Correctly Negritos

[2] Numbers may be erroneous.

Pampayacu, Hacienda at the mouth of Chinachao Río,[1] about 3,500 ft. alt., *Macbride 5127*.

SIBTHORPIA L.

Sibthorpia L., Sp. Pl. 631. 1753; Gen. Pl. 320. 1754. *Disandra* L. f., Suppl. Gen. Pl. 32. 1781.

Prostrate herb, rooting at the puberulent, distant nodes, stems glabrous or occasionally sparsely puberulent. Leaves alternate, pubescent on both surfaces, almost round, up to about 3 cm. in diameter, margins lobed, lobes rounded; petioles pubescent, frequently longer than the diameter of the blades; flowers solitary, axillary, pedicellate; pedicels pubescent, longer than the flowers; sepals 4 (3–5, rarely 8), united into a campanulate calyx; corolla little longer than the calyx, red or greenish-white, tube lacking or minute, lobes obtuse subequal; stamens 4 (3–5) equal, inserted near the base of the corolla, exserted beyond the tube, anther locules parallel, contiguous at apex; style about as long as the ovary, the pistil shorter than the stamens; capsule loculicidal, compressed-globose or broadly compressed-obovoid, little exceeding the calyx, apex obcordate; seed reticulate, dark red; placenta thin, septum deciduous.

A genus of about six species in the subtropics of the old and new worlds. One species with two forms collected in Peru.

Corolla red (rose-purple or pink); capsule glabrous or occasionally soft-pubescent.....*S. rotundifolia* f. *rotundifolia*.

Corolla greenish-white; capsule stiff-pubescent..*S. rotundifolia* f. *alba*.

Sibthorpia rotundifolia (R. & P.) Edwin, Fieldiana: Botany 31(8): 228. 1967. *Veronica rotundifolia* R. & P., Fl. Peruv. 1: 6. 1798. *Sibthorpia pichinchensis* HBK., Nov. Gen. et Sp. 2: 390, *t. 176*. 1817.

Flowers up to 4 mm. long; calyx about 3 mm. long; corolla rose-purple to pink, rotate or subrotate, lobes ovate, entire; capsules up to about 4.5 mm. long; seed several, compressed.

Junin: Mito, moist, deep humus in a "clearing" in eastern woods, alt. ca. 9,000 ft., *Macbride & Featherstone 1717*.

Sibthorpia rotundifolia f. **alba** Edwin, Fieldiana: Botany 31(8): 228. 1967. Differing from the typical form as in the key.

[1] May be another name for the Río San Juan, if actually Chincha Río.

Cuzco: Near Río Yanamayo, below "Pillahuata," wet mossy rocks by cascade, alt. 2,100–2,300 m., *Pennell 13935*.

The typical form having been collected in north-central Peru and the white-flowered form in southern Peru indicate a genus much more prevalent than the scanty material indicates.

The genus is well represented by collections from Mexico to Colombia and Argentina. The species limits, however, are poorly defined.[1]

STEMODIA

Stemodia L , Syst. Nat. ed. 10.[1] 118. 1759. *Lendernia* Minod., in Bull. Soc. Geneve II. 10: 240. 1918. *Unanuea* Pennell, Proc. Acad. Nat. Sci. 72: 160. 1920.

Ref. Minod in Bull. Soc. Bot. Geneve II. 10: 155–252. 1918.

Herb or less often shrub or subshrub, frequently glandular-pubescent or villose, often aromatic. Leaves opposite or verticillate, 3–4 in each verticil; flowers axillary, pedicellate, with often 1 sometimes 2, rarely more in each axil or forming spikes or spike-like, rarely racemose inflorescences; pedicels usually short, sometimes longer than the flower, ebracteolate or 2-bractiolate; calyx lobes 5, basally connate, narrow, all alike or the posterior lobe a little longer, imbricate; corolla white, blue or purple, with 4 lobes, the posterior pair fused, the 3 latero-anterior apparent, scarcely to strongly zygomorphic, bilabiate, the upper, posterior lip erect or arched, the lower, anterior, flattened, corolla tube cylindric, usually longer than the lobes; stamens 4, didynamous, usually included, filaments filiform, anther locules disjunct, stipitate; ovary ellipsoid to narrowly ovoid, shorter than the style that is apically dilated, stigma lobes 2, internally stigmatic; capsule globose, ovoid and usually acuminate, septicidal and often secondarily loculicidal; seeds numerous, minute, testa longitudinally furrowed.

While the collections bear about ten names it is felt that five species are adequate to designate the Peruvian Material. A genus of about 30 species, distributed throughout much of the temperate and tropical zones of the world, but basically warm-temperate to tropical American.

1. Flowers in spiciform inflorescences or spikes; pedicels bibracteolate; leaves opposite.

[1] *Sibthorpia repens* (L.) Kuntze based on *Willichia repens* L. may be conspecific with *rotundifolia*. They are maintained as distinct taxa for the present.

2. Corolla violet-blue, strongly zygomorphic, pubescent over the base of the lower lip; bracteoles and sepals attenuate, linear-lanceolate, equal in length or bracteoles shorter; annual or less often perennial ..... *S. durantifolia.*

2. Corolla white, scarcely zygomorphic, glabrous; bracteoles linear-acute, longer than the narrowly lanceolate, acute sepals; perennial ..... *S. piurensis.*

1. Flowers mostly axillary, occasionally in falsely spiciform inflorescences (*S. suffruticosa*); pedicels ebracteolate; leaves verticillate (opposite and verticillate in *S. parviflora*).

3. Leaf blades all or mostly less than 2.0 cm. long; anterior stamens with anthers smaller than posterior, anterior filaments inserted lower than posterior ..... *S. parviflora.*

3. Leaf blades more than 2.0 cm. long, up to 6.5 cm. long; anthers of all stamens equal in size, anterior filaments inserted higher than posterior.

4. Pedicels 5–6 mm. long; corolla often less than 10 mm. long, up to 12 mm.; flowers often more than one per leaf axil. *S. suffruticosa.*

4. Pedicels ca. 15 mm. long; corolla ca. 17 mm. long; flowers usually one per leaf axil ..... *S. chodati.*

Stemodia chodati Minod., Bull. Soc. Bot. Geneve II. 10: 199. 1918.

Erect shrub, stem striate, pubescent. Leaves up to 6.5 cm. long and 2 cm. wide, subsessile, ternate, ovate-lanceolate,[1] base attenuate, tissue on upper surface bullulate, very short-pubescent, margins dentate, teeth round or obtuse, subglabrous beneath; flowers solitary,[2] axillary[2]; pedicels 15 mm. long; sepals 11 mm. long and 0.5 mm. wide, subulate; corolla 17 mm. long, globose at base, constricted medianly, anterior lip 3-lobed, laterals ovate-lanceolate, acuminate, median broadly ovate, hardly acuminate, posterior lip rounded, little emarginate; anterior stamens longer and inserted higher on the corolla tube than the posterior the filaments of which are thicker; ovary ovoid; style thick, the apical stigma clavate; fruit unknown.

[1] Photograph of the type (the only) collection displays elliptically ovate leaves, and attenuate, acute or subobtuse bases.

[2] From photograph, Field Museum 8550.

Except as footnoted, this description from the original.

Amazonas: Prov. Chachapoyas, southern part. With neither collector or number. Presumably the type at the Geneva herbarium.

This species is closely related to *S. suffruticosa*, differing from this latter as in the key and having acuminate anterior lobes of the corolla as well as little different leaf shape and non-rostellate ovary.

Stemodia durantifolia (L.) Sw., Obs. Bot. 240. 1791. *Phaelypea erecta* P. Br., Nat. Hist. Jam. 269. 1756. *Capraria durantifolia* L., Syst. Nat. ed. 10. 1116. 1759. *Conobea verticillaria* Spreng., Nov. Prov. 13. 1819. *Stemodiacre durantifolia* (L.) Kuntze, Rev. Gen.: 466. 1891. *Stemodia erecta* (P. Br.) Minod, in Bull. Soc. Geneve II. 10: 212. 1918.

Erect, viscid, glandular-pubescent herb or subshrub, woody at base, branchlets and branches 4-angled or the older terete. Blades opposite or 3–4-verticillate, sessile often broadly clasping or amplexicaul, obovate, or elliptically obovate, acute at apex, long-attenuate toward the base and abruptly flaring at the stems or branches, up to 9–10 cm. long and 3.5–4.0 cm. wide, usually smaller, much reduced base to apex, margins serrate or serrate-dentate, glandular-pubescent beneath, less so above; inflorescences spiciform or spikes; flowers bracteate and bibracteolate, one in the axil of each bract; pedicels almost lacking; bracteoles lance-linear, attenuate, glandular-pubescent, clasping the calyx; calyx-lobes 5, lance-linear, attenuate, 4–6 mm. long, viscid, glandular-pubescent, fused at the base into a small tube, sepals about the length of the corolla tube; corolla light blue, the lobes very short, lips subequal, shorter than the tube, lower lip and tube densely pubescent within, upper sparsely so; stamens inserted more than halfway up the tube, the anterior pair of filaments almost twice the length of the posterior or the pairs almost equal in length; anther locules stipitate, small, about a fourth to a fifth the length of the filaments, stipe only little if at all thickened; style filiform, stigma abruptly bilobed; capsule shorter than the sepals, ellipsoid or subovoid-ellipsoid; seed when dry, almost black.

Piura: Negritos,[1] *Haught f-32*[2]: Parinas Valley, *Haught F-32*.[2]—San Martin: Alto Río Huallaga, 360–900 m., *Ll. Williams 6242*.

[1] Correctly Negritos

[2] These may be mixed numbers.

One of the most generally distributed species of the genus, occurring from California to Texas through Mexico, Central America, West Indies, and South America to Chile and Argentina.

Stemodia parviflora Ait., Hort. Kew. ed. 2, 4: 52. 1812. *Erinus verticillatus* Mill., Gard. Dict. ed. 8. 1768. *Capraria humilis* Soland. in Ait., Hort. Kew ed. 1. 2: 353. 1789 (non Pavon). *Stemodia arenaria* HBK., Nov. Gen. et Sp. 2: 287, *t. 175*. 1817. *Stemodiacre verticillata* Ktze., Rev. Gen. 2: 466. 1891. *Stemodia verticillata* Hassler, Contr. Fl. Chaco 110. 1909. *S. neglecta* Minod., Bull. Soc. Genève II. 10: 195. 1918.[1]

Repent or prostrate viscid herb, sometimes forming mats, rarely erect or suberect, then less than 1.5 dm. tall. Stems densely pubescent with lax, mixed glandular and eglandular, often multicellular hair; leaves opposite or more often verticillate, verticils 3-foliate, glabrous to pubescent, mostly sparsely pubescent or puberulent, the vesture frequently restricted to the veins and margins, usually broadly ovate triangular-ovate, up to about 1.5 cm. long and 9.0 mm. wide, usually smaller, less than twice as long as wide, acute, base variable,usually obtuse and the blade narrowly decurrent part way along the short, pubescent petiole, margins irregularly serrate, serrations antrorse, occasionally dentate or denticulate; pedicel very short, pubescent, ebracteolate; flowers solitary, usually 1 in an axil of a scarcely modified, leaf-like bract; calyx lobes 5, lanceolate, subulate, more or less than 1 mm. long, margins scarious; corolla 4–6 mm. long, light blue, lips subequal, the two posterior imperfectly fused, pubescent within, anterior and lateral, a little shorter, tube longer than the lobes, pubescent within; anterior pair of stamens with longer filaments and smaller anthers than the posterior, stipes little thickened, anthers included or little exserted beyond the throat, filaments unequally inserted in pairs, the anterior lower on the tube; ovary little shorter than the 2-lobed style; capsule about 3 mm. long, septicidal and secondarily loculicidal (hygroscopic?), obovoid or subglobose-ovoid; seed light brown, broadly ovoid.

Junin: La Merced, *Macbride 5673*.—Loreto: Near Iquitos, alt. 100 m., *Klug 1229*; Caballo-Cocha on the Amazon River, *Ll. Williams 2452*.—San Martin: San Roque, 1,350–1,500 m., *Ll. Williams 7753*. Sin. loc.: *Pavon*.

[1] This listing of synonyms is only partial since verification of all names is beyond the scope of this paper. The interested reader may wish to check *Conobea pumila* Spreng.; *Poarium veronicoides* (Desv.) Ham., and *Stemodia pauciflora* Rusby.

Widely distributed, reported from Mexico to Argentina including the West Indies.

Stemodia piurensis Pennell, Not. Nat. 179. p. 2. 1946.

Plant probably perennial, woody at base, stem glandular-pubescent or finely pubescent. Leaves oblong-lanceolate, acute, closely serrate-dentate with sharp outstanding teeth, glandular-puberulent, bluish green (at least when dry),[1] rounded-clasping at base, largest 3.0 cm. long and 7.5 mm. wide, lower somewhat narrowed proximally, middle and upper scarcely so and these latter subtending flowers; pedicels less than 1 mm. long; bracteoles linear-acute, longer than the sepals; sepals 5, narrowly lanceolate, acute, 4–5 mm. long; corolla white, glabrous, 4–5 mm. long, lobes subequal, uppermost and lowermost slightly larger than the others; anther cells slightly stipitate; capsule 3 mm. long, apparently conic.

Piura: Decumbent. River Valleys, Québrada Mogollón, Amotape Hills, in flower. March 28–30, 1941. *Haught & Swenson 11542* (BKL).

The original description is fully sufficient to demonstrate the differences between this taxon and *S. durantifolia* to which it is closely allied.

Stemodia suffruticosa HBK., Nov. Gen. et Sp. 2: 287. 1817. *S. frutescens* Reicheb., Hort. Bot. 1: 1827. (III). *Unanuea febrifuga* Steud., Nomen. 2: 729. 1841. *Stemodiacre suffruticosa* Ktze., Rev. Gen. 2: 466. 1891. *Stemodia suffruticosa* f. *dentata* Minod., Bull. Soc. Géneve II. 10: 201. 1918. *Unanuea dentata* (R. & P.) Pennell, Proc. Acad. Nat. Sci. Phila. 72: 161. 1920, based on *Unanuea* R. & P., Ic. Fl. Peru, ined.

Erect shrub or subshrub, pubescent, the hairs usually multicellular. Stem with internodes up to 10 cm. long, internodes on branchlets much shorter, less than 1 cm. long near the tips; leaf blades ternately verticillate, ovate, sometimes ovate-sublanceolate, bullulate, up to 4.5 cm. long and 1.6 cm. wide, usually smaller, pubescent on veins beneath and on tissue and veins above, apex acute, base acute or cuneately acute, margins crenate-dentate; flowers mostly 2–3 in each axil of the leaf-like bracts, pedicellate; pedicels 5–6(–8) mm.[2] long; sepals 5, united at the base only, linear to subulate or

[1] Plant unknown to me. Description after Pennell. *S. durantifolia* appears yellowish to dark green or brown-green when dry.

[2] According to Minod up to 11–12 mm. long—*Miers 3018*, Paccha Mountains.

very narrowly lanceolate, long-acute, 6–7 mm. long. Corolla when dry dark brown-red[1]; 9–13 mm. long, tube pubescent externally, pubescent or glabrous anteriorly internally, little longer than the sepals lobes equal, spreading; the anterior pair of filaments longer than and inserted higher on the corolla tube than the posterior, included in the tube, locules elliptic, connective thickened; style about twice as long as the rostellate ovary, thickened apically, persisting in fruit, stigma lobes distinct, internally stigmatic; capsule ellipsoid, or narrowly ovoid-ellipsoid, shorter than the sepals, septicidal and secondarily apically loculicidal; seeds oblong.

Piura: Prov. Ayabaca,[2] *Weberbauer 6351* and *6362*.

Widely collected from Mexico through Central America and western South America to northern Peru, none seen from the West Indies.

VERONICA L.

Veronica L., Sp. Pl. 9: 1753; Gen. Pl. 10. 1754.

Annual or perennial, glabrous, pubescent or glandular, erect, repent or prostrate herbs. Leaves all opposite or upper alternate, linear or lanceolate to broadly ovate, petiolate or sessile, entire or toothed, obtuse to acute or acuminate at one or both ends, about 1–7 cm. long and 0.3–3.0 cm. wide; flowers most often less than 1 cm. long, usually in lateral or terminal spikes or racemes, or axillary and racemose, pedicellate; calyx 4-lobed, tube very short or lacking, lobes lanceolate to ovate, acuminate, acute or obtuse; corolla rotate, 4-lobed (the 2 posterior wholly united), white to dark blue or violet, lobes ovate or sometimes narrower, equal in length and width or unequal in one or both dimensions; stamens 2, the anterior-lateral pair, filaments divergent and usually exceeding the corolla, anthers small, contiguous, parallel; style minute to 2–3 times longer than the globose or ovoid, often apically notched ovary, stigma lobes united or scarcely bifid at apex; capsule usually compressed, longer than wide or wider than long, often distinctly to deeply notched at the apex, with most often a persisting style or style base in the notch, when deeply notched the free parts of the capsule often divergent, longer or shorter than the sepals, loculicidal (secondarily barely sep-

[1] Blue in life according to Bentham and Minod; purple-blue according to Pennell.

[2] Often Ayavaca

ticidal), placenta thin, septum deciduous; seeds few or numerous, flattened, plane or convex dorsally and ventrally, yellow to yellow-brown, testa almost smooth to rugose. Six species thus far collected in Peru.

A genus of about 250 species, mostly old world but well represented in the new world with about 25 species. Specimens have been collected in wet to dryish sites at varying altitudes from Alaska to Chile. The following five species not yet collected may well be encountered in Peru, the first three more likely than the latter two: *V. beccabunga* L.; *V. didyma* Tenore; *V. salicifolia* Forst.; *V. americana* (Raf.) Schwein; *V. plebeja* R. Br.

1. Main stem indeterminate, without an inflorescence at its apex, all leaves opposite..... *V. anagallis-aquatica.*
1. Main stem determinate, terminated by an inflorescence; the bract-like, upper leaves alternate.
   2. Plants perennial from rhizomes; inflorescences terminal on lateral branches or axillary in the upper leaves of the plant.
      3. Stems pubescent throughout with upcurved hairs; corolla white or whitish with purple markings, 2 mm. long; capsule 3–4 mm. wide, pedicels minutely puberulent. *V. serpyllifolia.*
      3. Stems distally pubescent with mostly spreading hairs; corolla pale-violet with darker markings, 3–4 mm. long; capsules 4–5 mm. wide; pedicels pubescent..... *V. humifusa.*
   2. Plants annual, fibrous rooted; inflorescences or axillary flowers developed from at or near the base, floriferous over most of its length.
      4. Pedicels shorter than the lanceolate to linear sepals; seeds numerous, less than 1 mm. long; plants usually erect.
         5. Sepals equal; style minute, hidden in the notch of the capsule between the lobes; corolla usually white or whitish, occasionally pale-blue.... *V. peregrina* subsp. *xalapensis.*
         5. Anterior sepals longer than the posterior; style usually exceeding the capsule lobes, or if shorter, clearly apparent; corolla deep violet-blue..... *V. arvensis.*
      4. Pedicels longer than the ovate sepals; seeds few, 1.3–3.0 mm. long; plants repent..... *V. persica.*

Veronica anagallis-aquatica L., Sp. Pl. 12. 1753. *V. anagallis latifolia* Britt., Bull. Torrey Club 12: 49. 1895. *V. brittonii* Porter ex Pennell, Torreya 19: 168. *V. anagallis-aquatica brittonii* Pennell, Rhodora 23: 36. 1921.

Soft herbs growing in wet sites, erect or sometimes rooting at the nodes, essentially glabrous, rarely short-puberulent. Leaves sessile, cordate-amplexicaul or occasionally very short-petiolate, lanceolate, lance-ovate or lance-oblong, up to 7 cm. long and 2–3 cm. wide, serrate or entire, apex acute, often broadest at or near the base; inflorescences many-flowered, axillary racemes; pedicels up to 9 mm. long, longer than the flowers, subtended by a lanceolate, entire, glabrous bracteole; calyx lanceolate to narrowly ovate or oblong, 4–6 mm. long, lobes mostly long-acuminate; corolla little longer than the calyx, blue, pale-blue or violet; style longer than the ovary; capsule usually only little notched or rounded at apex; seeds numerous, small, yellow-brown, testa rugulose. Stamens as the genus.

Arequipa: Prov. Condesuyos, Huario Valley below Chuquibamba, alt. 4,000 ft., *Stafford 1150*; Banks of stream, alt. 7,600 ft., *Stafford 628*; Lower slopes of Misti, *Sandeman 3748*.

Collected on all continents except Australia and Arctic areas.

Veronica arvensis L., Sp. Pl. 13. 1753.

Pubescent, laxly erect, branching or unbranched, annual herb, hair soft or stiff. Lower leaves ovate, short-petiolate, upper, bract-like leaves lance-ovate or -oblong, sessile, lower leaves up to 1.3 cm. long and 7–8 mm. wide, upper much reduced, margins irregularly few-toothed with rounded or obtuse teeth below to entire above, ciliate, acute at apex, usually narrowed to base; internodes very short above; lower flowers axillary, solitary and remote from the congested upper flowers that form spike-like inflorescences, flowers usually subsessile, occasionally sessile; sepals lanceolate or narrowly oblong-lanceolate, anterior pair 3–4 mm. long, posterior 2–3 mm. long; corolla often shorter than the sepals, dark violet-blue, lobes broadly ovate, rounded; style about 1 mm. long, little longer than the ovary; capsule compressed-subglobose, brownish, often glandular pubescent at least on the darker hardened margins, little longer than wide to wider than long, usually about equaling or little shorter than the calyx, the notch at apex up to a third the length of the fruit, the style little exceeding the lobes; seeds numerous, ovoid, testa rugulose, light brown; placenta thin septum early deciduous.

Junin: Prov. Yauli, La Oroya, in stones by trail, alt. 12,000 ft., *Macbride & Featherstone 941*; Mito, alt. about 9,000 ft., *Macbride & Featherstone 1715*.—Sin. Dept.: Quinua, potato field, alt. ca. 12,000 ft., *Macbride & Featherstone 2028*.

Collected on all continents except Australia and the Arctic areas.

Veronica humifusa Dickson, Trans. Linn. Soc. 2: 288. 1794. *V. serpyllifolia humifusa* (Dickson) Vahl, Enum. Plant. 1: 65. 1805. *V. serpyllifolia neomexicana* Cock., Amer. Nat. 40: 892. 1906. *V. funesta* Machr. & Pays., Contr. Gray Herb. II. 49: 68. 1917.

Perennial, rhizomatous, partly downy herb, in dry or wet sites, erect or repent, stems distally pubescent. Lower leaves broadly ovate or elliptic, varying to suborbicular, up to 1.8 cm. long and almost as wide, margins entire to irregularly, subdistantly crenulate, rounded or obtuse at both ends, usually glabrous, occasionally puberulent, upper bract-leaves lanceolate or narrowly oblong or ovate, much reduced, margins minutely denticulate, ciliolate; inflorescences racemes; the lowermost, pubescent pedicels as long as the capsules; calyx lobes a little unequal, one anterior largest, the other smallest, posterior equal to each other, elliptically ovate to ovate, 2.5–4.0 mm. long; petals blue, 2.5–4.5 mm. long, the longest almost as wide, the posterior pair largest, broadly ovate, one anterior smallest, narrowly ovate, about half the posterior, remaining anterior petal medium; filaments thickening toward apex, stamens otherwise as the genus; style much longer than the often stiffly erect-puberulent, obovate, apically notched ovary; capsule usually 4–5 mm. wide, obovate, wider than long, strongly flattened, a little longer than the style, stiffly, sparsely, often glandular-pubescent at the merely emarginate apex; seed many, ca. 30–40, broadly ovate to suborbicular, ca. 1.0–1.3 mm. long, sometimes minutely emarginate at one end, testa light brown, almost smooth; placenta little thickened medianly, septum chartaceous, soon deciduous.

Huanuco: Carpish Pass on highway Tingo María–Lima, 84 km. W. of Tingo María, alt. ca. 2,750 m., *Allard 21047*; 15 mi. NE of Huanuco, very wet, boggy slope, alt. ca. 12,000 ft., *Macbride & Featherstone 2195*.—Junin: Prov. Huancayo, moist places near Huancayo, alt. 3,300–3,500 m., *Killip & Smith 23353*.—Sin. Depto.: Tambo de Vaca, mossy rocky uplands, alt. ca. 13,000 ft., *Macbride & Featherstone 1769*.

Closely related to *Veronica serpyllifolia* L. (see below) and perhaps only varietally distinct.

Widely distributed in both continents and islands of the new world as well as in Europe. Rarely encountered in east Asia.

Veronica peregrina subsp. **xalapensis** (HBK.) Pennell,[1] Torreya 19: 167. 1919.

V. xalapensis HBK., Nov. Gen. et Sp. 2: 389. 1818. *V. sherwoodii* Peck, Torreya 28: 56. 1928.

Erect or rarely prostrate, annual herb, densely to sparsely glandular-pubescent[2] on wood and fruit and sometimes on the leaves, internodes usually very short, shorter than the leaves. Leaves narrowly lanceolate or lance-oblong, reduced to linear above, longest up to 3.5 cm., often only 1.5–2.0 cm. long, margin entire or few and distantly, shallowly toothed, especially on the upper half, acute at apex, attenuate and decurrent over the very short petiole of the lower leaves, upper leaves often sessile; flowers axillary, remote and solitary below, inflorescences racemose or subspicate above; the pedicels shorter than the flower and fruit, up to 2–3 mm. long, most often shorter; calyx lobes lanceolate, equal, 3–4 mm. long, calyx tube lacking; corolla white, rarely blue, shorter than to about equaling the calyx in length, lobes ovate, equal or almost so, or the posterior a little wider; stamens short, only about half the length of the petals, otherwise as the genus; ovary obcordate, barely notched apically, style minute, stigma capitate; capsule flattened, ca. 4–5 mm. wide, wider than long, style hidden in the apical notch, lobes suberect to divergent; seed numerous, thin ca. 0.7–0.9 mm. long, flattened, testa smooth; placenta thin, septum deciduous.

Cuzco: Prov. Urubamba, Tun Capata, Santa Rita at alt. 2,800 m., *C. Vargas C. 2692*; Paucartambo to Tres Cruces, Cerro de Cusilluyoc at alt. 3,200–3,400 m., *Pennell 14156*; Huaracondo, alt. 3,300–3,400 m., *Pennell 13694*.—Junin: Mito, eastern wood, alt. about 9,000 ft., *Macbride & Featherstone 1720*. Lima: Matucana about 8,000 ft., *Macbride & Featherstone 288*; San Buenaventura, alt. 2,700–2,800 m., *Pennell 14546*.—Moquequa: Prov. Moquegua, swamp, alt. 3,100 m., *Weberbauer 7480*.—Pasco: Cerro de Pasco at alt. 14,000 ft.,

[1] Originally published as *V. peregrina xalapensis*. Pennell (1935) stated that the subspecies is the intended rank.

[2] The variety may be separated from the typical on the basis of vesture. *V. peregrina* subsp. *xalapensis* is the common subspecies of *peregrina* in Central and South America.

Plants glabrous ..... *V. peregrina* L. subsp. *peregrina*.
Plants densely or sparsely glandular-pubescent .... *V. peregrina* subsp. *xalapensis*.

Macbride & Featherstone 2399.—Puno: Lake Titicaca, Capachira Peninsula, Camjata Hacienda, alt. 12,600 ft., *Tutin 1013.*—Sin Dept.: Valle de Pancar at alt. 3,400 m., *Herrera 2327*; Río Blanco. Moist place by deserted house, alt. about 15,000 ft., *Macbride & Featherstone 813.*

Widely dispersed in the western hemisphere and generally cultivated over the rest of the world.

Veronica persica Poir., Encyc. Meth. 8: 542. 1808. *V. tournefortii* Gmel., Fl. Ead. 1: 39. 1805.[1] *V. buxbaumii* Ten., Fl. Nap. 1: 7, *t. 1.* 1811. *V. precox* Raf., Atant. Journ. 79. 1832, non All., 1789. *V. diffusa* Raf., N. Fl. N. Amer. 4: 38. 1838. *V. byzantina* (Sibth. & Smith) BSP., Prelim. Cat. N. Y. Pl. 40. 1888.

Repent, pubescent herb, the internodes usually longer than the firm leaves. Leaves petiolate, blades broadly ovate, obovate or shield-shaped, in the wild state up to 2–3 cm. long and up to 2 cm. wide, in gardens much larger, margins irregularly, strongly dentate or lobed, when lobed the lobes acute, entire, blades usually acute at both ends, varying to subobtuse at apex and obtuse at base, sparsely pubescent on both surfaces; petioles pubescent below on the groove, up to 1.5 cm. long, mostly 3–7 mm. long, often winged by the attenuate leaf-base; flowers axillary, solitary, long-pedicellate; pedicels pubescent, up to 3 cm. long, much exceeding the flowers and fruit, filiform, little reflexed near the apex; calyx lobes united into a short tube, ca. 1.0–1.5 mm. long, ovate and about 2 times as long as wide, ciliolate, equal, 5–7 mm. long; corolla light blue to dark violet-blue, petals broadly ovate, equal or almost so, mostly little shorter than to equaling the sepals, entire; stamens little shorter than the petals, anthers large for the genus, about a third to a fourth the length of the filaments; ovary very broadly obovoid, apically slightly notched, pubescent on the flattened edges, much shorter than the 2.5–3.5 mm. style, stigma lobes united, punctiform; capsule wider than long, flattened, lobes widely divergent, pubescent on the edges, style exceeding the lobes; seeds ovoid, brown, narrowed to micropylar end; septum soon deciduous, placenta thin.

Cuzco: Sacsahuamán above Cuzco, alt. 3,500 m., *Pennell 13576*; Calca, Hacienda Urco, *C. Vargas C. 3135*; Prov. Cuzco, Sacsahuamán, alt. 3,600 m., *C. Vargas C. 1543.*—Huancavelica: Prov. Huan-

[1] Epithet predated by *V. tournefortii* Vill. (1771)=*V. officinalis* L.

cavelica, W. of Huando, alt. 3,650 m., *Hutchison 1675*; Prov. Tayacaja, Hills N. of Pampas, alt. 3,250 m., *Stork & Horton 10234*.—Junin: La Merced, Hacienda Schunke, alt. ca. 4,000 ft., *Macbride 5671*.—Lima: Matucana, alt. ca. 8,000 ft., *Macbride & Featherstone 125*; Canta, open rocky, small canyon, alt. 3,000–3,200 m., *Pennell 14598*; Huaros, alt. 3,400–3,600 m., *Pennell 14733*.

An Eurasian species now well established in the western hemisphere from Alaska to Chile, but not yet collected in Central America.

Veronica serpyllifolia L., Sp. Pl. 12. 1753.

Repent herb with stems ascending at apices, stems and pedicels pubescent with short, white, upcurving hair throughout. Lower leaves ovate-oblong or oval, minute to 2 cm. long and little narrower, obscurely crenate, obtuse, short-petiolate, the upper, bract-like leaves narrowly ovate, sessile; flowers in racemes; pedicels up to 3–5 mm. long; calyx lobes almost free, equal, ovate, ca. 2–3 mm. long; petals about as long as the calyx, ovate, obtuse, white or whitish or light-blue with blue or violet markings; stamens little shorter than the petals; ovary obovoid, barely notched, shorter than the style, stigma discoid-punctiform; capsule strongly flattened, glandular-pubescent on the edges, 3–4 mm. wide, little wider than long and little longer than the style, notched only about a fifth to a sixth its length; seeds numerous, ovoid, about 1 mm. long, apiculate at micropylar end, testa light, yellow-brown; septum chartaceous, soon deciduous, placenta thin.

Cuzco: Chichacori Valley, alpine meadows, alt. 10,500 ft., *Fisher 3*: Lauramarca, alt. 3,800 m., *Rauh-Hirsch P1129*; Paucartambo, Acanacu, alt. 3,600 m., *C. Vargas C. 149*; Quispicanchis, Marcapata, environs of Huaillai, alt. 3,300–3,600 m., *C. Vargas C. 9170*.—Puno: Prov. Sandia, Limbani, alt. 3,000 m., *C. Vargas C. 1283* and at alt. 3,000–3,400 m., *9637*.

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